

Psychological Bulletin

Forty-seventh Annual Meeting
of the
American Psychological Association

Stanford University
and the
University of California

Monday, Tuesday, Wednesday, and Thursday
September 4, 5, 6, 7

1939

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CONDENSED PROGRAM SCHEDULE

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GENERAL

Monday, September 4, 9:00 A.M.

Room 2, Education Building

WALTER R. MILES, Chairman

9:00 A.M. *Evidence for the Recording Error Criticism of ESP Data.*
JOHN L. KENNEDY, Stanford University.

Photostatic copies of original records from J. D. MacFarland's experiment, "Discrimination Shown Between Experimenters by Subjects" (*J. Parapsychol.*, 1938, 2, 160-170), were reexamined for recording errors. This experiment deviates from the usual ESP recording methods in that two experimenters made independent records of the subjects' calls. A total of 69 errors which affected the score was found, only 24 of which were discovered by the two independent checks discussed in the experimental report.

Evidence for a large number of recording errors of the "inversion" type in the card column was obtained by an analysis based upon the extra-chance occurrence of adjacent pairs of hits. When subtractions indicated by this analysis are made, the extra-chance scores reported for MacFarland's experiment are reduced to the chance level. [10 min., slides.]

9:15 A.M. *A Theoretical Consideration of the Basis for Approach-Withdrawal Adjustments in Behavior.* T. C. SCHNEIRLA, Washington Square College, New York University.

Various theoretical systems in psychology have been built upon *a priori* acceptance of a negative-positive differentiation in behavior. However, the conditions which are responsible for the ontogenetic appearance of such a differentiation appear to be unclearly glimpsed.

A consideration of the evidence for infra-mammalian animals shows a more or less distinctly inherent basis for a "sign" differentiation of

behavior. This rests upon the properties of stimulation at different intensities in accounting not only for quantitative differences, but especially for qualitative differences in adjustment to the environment. An analysis of adaptive behavior in one well-investigated animal shows that stimuli at high intensities typically elicit a general reaction in which the predominance of a differentiated excitation-reaction system virtually insures withdrawal from the source. Conversely, weak stimuli predominantly arouse the antagonistic system and typically produce an approach to the source of stimulation.

This conception envisages negative-positive responses as fundamentally attributable to the differential arousal of excitation-reaction systems which function as though they possessed distinctively different activation thresholds. Through natural selection, we may hypothesize the evolution of such mechanisms along adaptive lines.

This view has utility as a hypothetical basis for understanding approach-withdrawal behavior in man. The problem has been dealt with previously in a rather fragmentary way, evidently because of complexity and the initial absence of directionalized general reactions in neonate behavior. Evidence from general studies of early behavior, of emotional development, and of certain crucial adjustments such as the reaching reaction, may be profitably organized on this basis. The bearing of this "reaction-system-threshold" theory upon concepts such as "appetite-aversion," "vectors," "sign-gestalt" and the like, will be considered. [15 min., slides.]

9:35 A.M. *Some Critical Revisions and Extensions of Lewin's Topological and Hodological Psychology.* ROBERT LEEPER, University of Oregon.

The publication in December, 1938, of Lewin's monograph, on directions of forces within the life space and on methods of measurement of psychological forces, rounds out his discussion of basic constructs for the psychology of motivation, and makes opportune a critical discussion of his system as a whole.

Certain confusions and misinterpretations are found within Lewin's treatment because (1) he defines regions within the life space as indicating sometimes anticipated activities, and sometimes *objects* of activity, (2) he uses the concept of "barrier" to refer sometimes to psychological facts (regions within the life space) and sometimes to objective obstacles whether or not they are appreciated as such by the person, (3) he speaks of the life space as permitting locomotions through it, whereas locomotions, except as anticipated, seem always to be objective activities. The implications are pointed out that follow from stricter adherence to Lewin's own best usages.

Some extensions are needed, especially to recognize several basic types of conflict situation, one of which results from anticipated irreversible paths, and another from forces resulting from anticipated locomotions of the surrounding field. Some situations require a concept of "decision-serving screens."

Lewin's definitions of direction and of relationships between directions are found inapplicable to a number of important situations, and in some cases are found not to conform with such criteria as summation of forces, creation of tension states, etc., which might indicate equality, oppositeness, and partial equality of direction. New definitions of direction and of relationships between directions are proposed that attempt to conform more adequately to Lewin's basic dictum that direction is a property of paths as wholes. [15 min.]

9:55 A.M. *The Unit of Description in Psychology.* KARL F. MUENZINGER, University of Colorado.

In order to make a scientific analysis of behavior it is necessary to have a unit of description. Any scientific analysis attempts to reduce the chaotic complexity of observed events to a systematic simplicity of lawful relationships which transcend the geographic-historical settings of the events. A unit of description of psychological events makes it possible to give a simplified and systematic description of the stream of behavior, and to compare different segments of this stream with each other in order to discover recurring similarities and propose lawful relationships. Such a unit has the further advantage that it provides a common theoretical framework for diverse problems and experiments.

Three different units are described and evaluated: (1) stimulus-response; (2) the psychological field; and (3) the start-to-end-phase unit comprising a cycle during which a single direction of behavior can be observed. It is claimed that the third unit offers a more adequate basis for a systematic analysis of behavior than do the other two. Within the start-to-end-phase unit we can distinguish four types of factors which permit a complete description of behavior. The factors of motivation determine the direction of behavior and the strength with which it moves towards the end-phase. The factors of discrimination break up the psychological situation into elements (that is, things and what they do) which guide behavior towards the end-phase. The factors of performance modify the situation (by locomotion, manipulation, or speech) so that the end-phase will be brought about. And finally, any changes in the dynamic relationships within the psychological situation (as by blocking, removal of obstacles, or threat of danger) generate affective factors. [15 min., slides.]

10:15 A.M. *Psychological Distance as a Function of the Intensity of Psychological Need.* RICHARD S. CRUTCHFIELD, Mount Holyoke College.

A series of experiments were undertaken to test the hypothesis that for the rat the magnitude of psychological distance in the psychological field is directly influenced by intensity of need.

Twenty blind rats partially learned the problem of making a turn to food always in side-path number six of a series of ten similar non-food side-paths spaced equally along an eleven-foot elevated runway. Sensory cues were controlled, so that the relatively high level of performance finally achieved by the rats is explicable only in terms of 'kinesthesia.'

broadly defined, or preferably, in terms of an hypothesis of preparatory set or expectancy, *i.e.*, 'behavior potential,' of the animal for expenditure of a specific amount of work in running the required distance.

Critical trials were given in which various groups had an intensity of hunger drive either increased or decreased from the normal level. The results of these critical trials indicate that under conditions of increased drive the rats run a greater average distance before making their turn, and under conditions of decreased drive they run a lesser average distance before the turn, as compared with the distances on control trials under normal intensity of drive.

Similar experiments with blind rats on a 10-unit linear maze, having one unique left turn in a series of right turns, indicate that the magnitude of the psychological distance to the unique turn, which is an outstanding feature of the cognitive structure of this maze, is dependent upon the intensity of drive. In general, then, it is indicated that the dimension of distance in the psychological field is variable with respect to intensity of psychological need.

Further discussion and interpretations are given. [15 min., slides.]

10:35 A.M. *Interregional Migration of Psychological Talent.* J. E. GREENE, University of Georgia.

Scope of the Study.—As herein used, "psychological talent" refers to the 1,218 psychologists listed in the 6th edition (1938) of *American Men of Science*. Making use of Odum's classification of the United States into seven regions, data were obtained on each of the following six categories of interregional migration: (1) *nativity—training* interregional migrations; (2) *nativity—first employment* interregional migrations; (3) *nativity—present employment* interregional migrations; (4) *training—first employment* interregional migrations; (5) *training—present employment* interregional migrations; (6) *first employment—present employment* interregional migrations.

Procedure.—The job analysis involved includes the following procedures: (1) Editing of biographical sketches in the 6th edition (1938) of *American Men of Science* to isolate psychologists. (2) Transcribing of selected data from the edited biographical sketches to transcription sheets. (3) Coding of transcribed items. (4) Punching of coded items in individual Hollerith cards. (5) Sorting of punched cards to secure desired classification of data. (6) Analysis of data (including the calculation of coefficients of contingency; the amount and reliability of differences in percentage of interregional migration, of each of the six types, at different levels of training; etc.).

Results.—The above-described data are analyzed in terms of the six major categories of interregional migrations and in the light of available supplementary data. The various coefficients of contingency indicate that positive interrelationships exist among each of the four variables (regions of *nativity*, *training*; *first employment*, *present employment*), at each of the three levels of training (bachelor, master, doctorate). However, the extent of the relationship varies notably from one migration type to another and from one level of training to another. Marked and

significant regional differences in the six types of interregional migration are analyzed and their implications discussed. (Acknowledgment of aid by Mr. W. F. Lawrence, a non-member graduate fellow, is gratefully made.) [15 min.]

10:55 A.M. *What Is Special Ability?* NORMAN C. MEIER, University of Iowa.

A new conception of special ability is offered, disclosing a curious interlinkage of hereditary elements (ancestral occupations) with hereditarily conditioned development. A theory of 'constitutional stock' inheritance is advanced as the most logical interpretation of accumulated data. This report is a concluding statement of the Spelman-Carnegie Art Research Project at Iowa and refers to work of twenty assistants and the participation of thousands of children and adult subjects over a ten-year period.

As now understood, a special ability is a combination of factors—some hereditary, some acquired on a conditioned basis—that drive toward and facilitate accomplishment in the field. In the instance of artistic aptitude (the more inclusive term) six fundamental factors were found normally to be present. Three have reference primarily to heredity (setting limits of development), identified as manual *skill* or craftsman ability, volitional *perseveration*, and aesthetic *intelligence*. While the other three, isolated as *perceptual* facility, creative *imagination*, and aesthetic *judgment*, are regarded as primarily acquired, they are to some extent conditioned in their development by special (stock) inheritance. Some degree of constitutional stock inheritance is hence indispensable, since it not only provides the psycho-somatic conditions for the ready acquisition of craftsman skills but also conditions in the artist the functioning of perceptual, imaginative and judgment processes. The craftsman habit of work thus developed tends to direct a particular manner of perceiving and sets the framework for the judgment process. The artist thus illustrates a curious interlinkage of hereditary elements (ancestral occupations) and present particular modes of learning. The finical regard of the disciplined artisan for nice order and proper placement is foundational to a later studied regard for the demands of good balance, rhythm and proportion. Other factors will be discussed. [15 min., slides.]

CLINICAL

Monday, September 4, 9:00 A.M.

Room 521, Hydraulic Laboratory

ROBERT G. BERNREUTER, Chairman

9:00 A.M. *Psychoanalysis and Experimental Methods.* BELA MITTELMANN and HAROLD G. WOLFF, New York Hospital and Department of Medicine, Cornell University Medical College.

The correlation of psychoanalytic and physiological data resulted in an increase in accuracy in method, concept and formulation. The finger temperature of experimental subjects was recorded during affective stress induced by prolonged discussion of distressing life situations. Secondly, the finger temperature was continuously recorded during regular interviews of patients under psychoanalytic investigation. The patient's affective state at any given moment during the analytic hour was ascertained and correlated with the simultaneously observed physiological change.

Observations may be formulated as follows: (1) Emotional reactions were complex with one affect dominating at the moment. (2) Predominant fear, anger, depression, elation were accompanied by a fall in finger temperature. (3) During emotional reactions of which the subject was unaware, yet which as judged by speech and behavior were apparently existent, the finger temperature also fell. (4) During attitudes of "detachment" toward disturbing situations with illusory attitudes of security and self-esteem, the finger temperature remained at the relaxation level. (5) Major sustained falls in finger temperature were associated with states of tension, anxiety and conflict. (Maximum fall observed was 13.5° C.) (6) During periods of sexual phantasy the finger temperature rose. (7) Thus, it was shown in detail how certain personality needs manifested themselves in significant situations, and how the emotional reactions and phantasies were correlated with the appearance and disappearance of physiological changes. [15 min., slides.]

9:20 A.M. *An Association-Set Method in Psychotherapy.* DOROTHY HAZELTINE YATES, San José State College.

The problem was to find a quick and lasting method of dispelling undesirable emotional reactions. The method found most effective is best described by example. A girl of nineteen was much troubled by her habit of bursting into tears when with men, especially her father. The remedy lay in building strong associations of relaxation, calmness, and security, with a word regarded by the subject as particularly meaningful, in this case, the word "calm." While in a very relaxed state, the subject was instructed to think of the word "calm" and associate with it certain definite ideas of peace, security, and well-being, always with the conviction that at any future time the word "calm" would reinstate the same condition of physical and mental relaxation and composure. There were no failures by this method. Young adults were cured—no relapses after two years—after three one-hour treatments. [10 min.]

- 9:35 A.M. *An Experimental Study of the Process of Adjustment in Delinquent and Nondelinquent Children.* H. MAX HOUTCHENS, Division for Children, Washington State Department of Social Security, Olympia, Wash.

This is the report on one of a series of performances the experimenter is attempting to standardize for prognostic purposes in the field of child adjustment. It is the purpose of the study to substantiate experimentally that there are measurable determining tendencies that develop in, or are causative of, a delinquent population.

In this experiment the subject's abilities to break down old perceptual patterns and replace them with new patterns obtained in mirror-tracing acts are observed. Significant differences are obtained in both qualitative and quantitative comparison of delinquent and nondelinquent children.

Kinetic sets appear to have a close relationship to adjustment patterns. [10 min., slides.]

- 9:50 A.M. *An Approach to the Mental Organization of the Feeble-Minded.* ALICE J. PHILP, Letchworth Village and Institute of Child Welfare, University of Minnesota.

The statistical definition of feeble-mindedness as the lower end of the distribution curve of Binet "intelligence" is rather widely held. Mental deficiency so considered is but a small amount of the composite of abilities possessed by normals. Lewin suggests, however, that the entire mental make-up of the feeble-minded individual differs qualitatively from that of the average individual, is rigid, and lacks fluidity.

To study this question, two groups of 25 boys each, matched for Binet mental age (7-9), all inmates of Letchworth Village, were administered individually the following five tests: Rorschach, scored with reference to "constriction" versus "dilation" of the total personality; variations of Weigl's tests measuring ability to change one's set spontaneously; a simplification of the Vigotsky concept-formation test; a modification of Maller's perseveration test; and a peg-board position learning test measuring interference and transfer of training.

The younger boys had an average chronological age of 12 and an average I.Q. of 70, the older group, an average C.A. of 20, and I.Q. of 50. The higher group fell into the "borderline" classification of intelligence and were primarily behavior problems before commitment; while the older group were, without question, mentally incapable of existing independently. No case of feeble-mindedness as the result of any known injury was included.

Test results will be discussed with reference to differences in C.A., I.Q., Binet pattern, and institutional adjustment in an attempt to evaluate Lewin's theory of feeble-mindedness and other concepts of general intelligence. [15 min., slides.]

- 10:10 A.M. *Differential Syndromes in Stanford Binet Failures.* FLORENCE MATEER, Merryheart Clinic, Columbus, Ohio.

Progress in clinical psychology depends upon its ability to ameliorate the condition of the individual who seeks psychological help.

Relief, or corrective procedure, depends upon proper clinical identification of the handicapping symptoms.

Differential syndromes of symptoms for hypothyroidism and hypopituitarism, at least, present themselves in the relative failures of such cases on the Stanford Binet and other test series. For instance, inferiority in the memory span for the repetition of digits marks the hypothyroid child in even mild cases.

Such syndromes vary for different causal factors yet are highly similar in cases affected by the same handicapping factor regardless of actual mental level.

Treatment modifies and often totally eliminates the syndrome, thus rapidly increasing the mental age. It may reappear with premature cessation of medication, the mental age dropping or remaining static.

This is a field which can be handled only by full coöperation with the medical sciences. [10 min.]

10:25 A.M. *A Statistical Analysis of the Validity of the Babcock Test of Mental Deterioration.* AGNES A. SHARP, The Psychiatric Institute of the Municipal Court of Chicago.

A practical problem in clinical psychology is the determination of the degree of mental deterioration in humans which should be termed pathologic and which indicates need for treatment of the patient in a mental hospital.

Quantitative tests of impairment of mental functioning are difficult to devise. Harriet Babcock made such a scale, standardized it on a paretic group, and published her results as "An Experiment in the Measurement of Mental Deterioration." Her "method of determining the degree of mental deterioration was to measure the discrepancy between scores on (Terman) vocabulary test which requires only previously formed associations and correlates highly with intellectual level, and scores on other tests which emphasize new learning and speed, that is, mental efficiency." Her other tests include digits, pronunciation, immediate reproduction, maze, substitution, Knox Cube, etc.

The immediate concern of this study has been to determine the validity of the Babcock Test when used with chronic alcoholics and other non-paretic patients. To that end the Babcock Test scores of 81 patients, whom the psychiatrists in the Psychiatric Institute qualitatively diagnosed as markedly deteriorated mentally, were analyzed statistically. The analyses made were: (1) The reliability of the short form of 20 tests used in this study, as determined by the Spearman-Brown formula, was .899. The longer form of 30 tests yielded a reliability of .931 by the same formula. (2) The r between the vocabulary test and each test was determined. The range was found to be from .083 to .755. (3) An item analysis based on inter-test correlations. (4) A factorial analysis was made to determine the factors present. We chose five factors which we have tentatively identified as (a) verbal, (b) motor, (c) memory, (d) an ability and/or willingness to manipulate abstractions, (e) mental fluency. [15 min., slides.]

10:45 A.M. *A Study of Specific Traits in Cases of Alexia.* GRACE M. FERNALD, University of California.

This paper reports findings based on a study of 60 cases of alexia and a study of autobiographies and biographies of individuals having similar disabilities.

The cases included in the experimental study are all individuals of normal intelligence, ranging in age from nine to twenty-two years. Results are given (1) of a study of the emotional adjustments in each case, (2) of detailed records of the learning process, (3) of certain experiments in learning Braille, (4) of the analysis of mental tests.

Results. (1) In all cases we found emotional instability a characteristic of the individual. In all but four cases the emotional maladjustment began only after or at the same time as the failure to learn to read. In all cases the emotional stability was restored by the development of normal skill in reading and other subjects without attention to the emotional problem as such. (2) In all cases the learning curve for reading was normal when the technique was adapted to the individual. Certain peculiarities were found in the learning process such as the use of kinesthetic methods and a blocking of the learning progress when the use of these methods was interfered with or auditory distractions were introduced. In all cases the individual responded slowly to verbal directions. (3) In learning Braille, the alexia cases slightly surpassed the control group. In all cases the subject could read Braille with only the visual stimulus, after it had been learned in the usual way, even in cases in which he was still unable to read the printed word. (4) A study of the results of intelligence and other tests show specific respects with reference to which the alexia cases differ from the average normal individual.

The descriptions found in autobiographies and biographies of individuals who report difficulty in reading and spelling agree with the results of our experimental studies. [15 min.]

BRAIN FUNCTIONS

Monday, September 4, 9:00 A.M.

Auditorium, Education Building

NORMAN R. F. MAIER, Chairman

9:00 A.M. *The Effects of Cortical Lesions on Emotional and Regressive Behavior in the Rat.* W. C. BIEL and L. I. O'KELLY, Ohio State University.

The relationships between lesions in the cerebral cortex of the rat and emotional and regressive behavior were investigated in this study. Albino rats rated for tameness or docility and systematically handled were divided at 80 days of age into 3 groups by the split-litter technique. The groups were equivalent in terms of sex ratio and tameness ratings. Animals in Groups A (N=28) were subjected to bilateral cortical lesions of varying percentages distributed over different areas of the cortex. Group B animals (N=29) were subjected to identical operative procedure, with the exception of the skull trephination and the cortical insult. Group C (N=31) consisted of normal animals. After a 15-day recovery period (and at a comparable age for the control group) another period of systematic handling was introduced. Following this handling observations were made on behavior in a field situation. Training was then given on a straightaway maze with thirst motivation. The animals were next trained on a one-unit T-maze to a rigid criterion of mastery in one direction, followed by training in the opposite direction to the same criterion. On the trial following the achievement of the second criterion, shock was administered at the choice point. The direction and intensity of activity in the animals after shock were recorded.

Group differences in measures of field behavior were small, although consistent, and relationships between these measures and size of cortical lesions were low. Differences were present between the groups in learning scores on the straightaway and T-maze situation. Learning scores were positively correlated with size of lesions. Reactions of the animals to shock, certain reactions being considered regressive, were found in the case of the operate group to be related to the character of their previous performances. [15 min.]

9:20 A.M. *The Rôle of the Superior Colliculi in the Mediation of Optic Nystagmus.* KARL U. SMITH, University of Rochester.

The present experiment was carried out in collaboration with Mrs. Marjorie D. Bridgman, of Ohio State University.

This study reports results bearing upon the rôle of the superior colliculi in mediating optic nystagmus elicited by movement of the visual field. Records were obtained of the optic head nystagmus of fifteen guinea pigs, by means of a mechanical recording system. Two series

of preoperative tests on each animal provided records of the frequency of the nystagmic movements at different effective velocities of visual movement.

Preoperative results were compared to similar data secured on the animals after: (1) unilateral removal of the occipital area of the cortex combined with destruction of the colliculus on the same sides; (2) bilateral removal of the occipital areas combined with destruction of both superior colliculi; and (3) unilateral and bilateral lesions of the superior colliculi.

The postoperative results consistently showed that unilateral destruction of the superior colliculus, whether or not associated with cortical injury, serves to produce defects in optic nystagmus when the visual movement occurs toward the side of the operation. Similarly, bilateral lesions of the colliculus, whether or not associated with cortical injury, produce defects in nystagmus in both directions of rotation.

The results indicate that the subcortical pathways subserving optic nystagmus in a given direction are predominantly segregated in one superior colliculus. Further observations have shown that, with stimulation of only one eye, optic nystagmus can be elicited in only one direction, *i.e.*, with movement toward the side of the non-seeing eye. It would seem therefore that, in the guinea pig, a single retina is represented mainly in the contralateral colliculus. [15 min., slides.]

9:40 A.M. *Category Behavior and Frontal Lobe Lesions in Man.* WARD C. HALSTEAD, Otho S. A. Sprague Memorial Institute and Division of Psychiatry, University of Chicago.

As one aspect of our investigation during the past four years of the behavioral effects of brain lesions in man, we have studied behavior traditionally regarded as involving *abstraction*. For this purpose we have found it necessary to develop test-situations of the grouping or category type. In developing a wide range of such test-situations, we have sought adaptations appropriate for man of Klüver's method of "equivalent and non-equivalent stimuli."

The results of applying one of our test-situations, an object-grouping test, to three series of individuals: (1) normal (control) individuals, (2) individuals with brain lesions outside of the frontal lobes, and (3) individuals with frontal lobe lesions, are reported. In the analysis of our findings both qualitative and quantitative aspects of the test-situation are considered. Tentative conclusions are drawn concerning some aspects of frontal lobe functions. [15 min., slides.]

10:00 A.M. *The Relation of the Electro-Encephalogram to Intelligence Level in the Mongolian Type of Mental Deficiency: Series 2.* GEORGE KREEZER, Cornell University and Dept. of Research, Letchworth Village.

The present study represents part of a series of studies being made to determine whether the electro-encephalogram is of value as an index of psycho-physiological factors associated with intelligence. The use of mentally deficient subjects has important methodological advantages in

the investigation of this question. They make available, for example, a wide range of intelligence levels and permit the independent control of mental age and chronological age variables. To provide homogeneous groups, each type of mental deficiency is being dealt with as a separate experimental unit.

In a previous investigation with 50 subjects of the Mongolian type of mental deficiency, a significant correlation was found between occipital alpha index and Binet mental age level, but absence of a significant correlation of mental age with alpha wave frequency. The present paper reports results of an investigation of an entirely new group of 48 subjects of the Mongolian type. A statistically significant correlation was again found of mental age level with alpha index but not with alpha frequency or with delta index. The theoretical significance of these results will be considered. [15 min., slides.]

10:20 A.M. *Bilateral Differences in Brain Potentials from the Two Hemispheres in Relation to Laterality and Stuttering.* DONALD B. LINDSLEY, Emma Pendleton Bradley Home and Brown University.

By means of appropriate amplifying and recording systems brain potentials have been recorded simultaneously from bilaterally homologous areas (occipital) in 48 righthanded, 8 lefthanded and 9 ambidextrous children. Simultaneous bilateral records were also obtained from occipital and motor speech areas of two adult stutterers during periods of rest and non-stuttering and stuttering speech. In all cases the records were studied particularly with respect to the phase relationships of the alpha waves in the two hemispheres and the amount of unilateral, spontaneous blocking that occurred.

The results indicate that the incidence of asynchronism of alpha waves in the two hemispheres is significantly less in the righthanded group of children than in either of the other two groups; the ambidextrous group shows the most asynchronism. The occurrence of unilateral blocking of the alpha rhythm is also greater in the lefthanded and ambidextrous groups; but no significant difference in blocking in right or left hemispheres was found for any one group.

In the stutterers the degree of asynchronism was high but was not increased during stuttering speech. Unilateral blocking of alpha waves was very much greater during stuttering than during periods of silence or non-stuttering speech.

The results will be discussed in relation to integration and control in the two hemispheres, particularly with reference to stuttering. [15 min.]

10:40 A.M. *A Fourier Analysis of the Electroencephalogram from One to Eighteen Years.* JOHN R. KNOTT, University of Iowa, and FREDERIC A. GIBBS, Harvard Medical School.

Left and right occipital, motor, frontal and temporal electroencephalograms have been recorded from a series of 130 normal children and adolescents. By means of the Grass photo-electric wave analyzer these have been transformed into energy vs. frequency spectra. The range of

frequencies thus analyzed is from 2 to 50 cycles per second. Analysis of the left occipital transforms indicates a pattern at one year exhibiting relatively high energy at frequencies 6 per second, and an absence of any well-defined peaks throughout the entire spectrum. There appears to be a gradual emergence, with age, of energy peaks in the so-called "alpha" (8-12 cycle) and "beta" (18-30 cycle) frequencies, coupled with an increase in the absolute frequency values of these two energy peaks. The occipital transforms will be discussed in relation to transforms of other cortical areas and in relation to adult transforms. [15 min., slides.]

ABNORMAL PSYCHOLOGY

Monday, September 4, 1:30 P.M.

Room 2, Education Building

I. KRECHEVSKY, Chairman

1:30 P.M. *Life Expectancy of Low Grade Mental Defectives.* OSCAR KAPLAN, University of California.

A study was made of the life duration of 768 idiots and imbeciles, exclusive of epileptics, dying in the Sonoma State Home at Eldridge, California, between the years 1917-1939. The average life span of the 424 imbeciles was 26.60 years and that of the 344 idiots was 19.04 years. These figures, however, do not give an accurate picture of the potential life duration of certain types of mental defectives. It is pointed out that 15.80 per cent of the imbeciles and 7.00 per cent of the idiots survived beyond 50 years of age, and that 208 low grade defectives above 50 years of age are still living at the Sonoma State Home. Female imbeciles have a 5.65 years greater life expectancy than male imbeciles, though they live under practically identical conditions. An analysis of the causes of death reveals respiratory disease as the leading cause (especially tuberculosis and pneumonia), and an increase in the number of circulatory failures with increasing age. Relatively few deaths are directly due to failure of the nervous system. Evidence is introduced which indicates that heredity may be a factor in the longevity of mental defectives. It is emphasized that the categories "idiot" and "imbecile" are neither medically nor psychologically homogeneous. On the basis of the results obtained, and assuming that present trends are continued, a substantial increase in the life expectancy of low grade mental defectives is predicted. The social consequences of such an increase are pointed out. [15 min.]

1:50 P.M. *The Etiology of the Deteriorating Psychoses of Adolescence and Early Adult Life.* BARNEY KATZ, University of Southern California.

This study was undertaken to determine the etiological role of cerebral birth trauma in the deteriorating psychoses of adolescence and early

adult life. More specifically, it sought to ascertain (1) what traumatizing factors and (2) what factors which determine brain vulnerability are present as etiological factors in the deteriorating psychoses. As cerebral injuries occur during difficult labor and from instrumentation the following traumatizing factors were investigated: (1) mother's age at subject's birth, (2) subject's order of birth, (3) duration of labor, (4) type of presentation, (5) obstetrical complications, (6) pelvic deformity in the mother, and (7) instrumental or version birth. In addition, post-natal factors and heredity were also investigated.

The birth records and family histories of 100 mental patients, all of whom were diagnosed as either "dementia praecox" or "schizophrenia," were analyzed and statistically evaluated. One hundred unselected individuals were similarly investigated and used as controls.

On the basis of the findings the following conclusions seem justifiable: (1) In many instances the deteriorating types of schizophrenic psychoses of adolescence and early adult life appear to originate in a cerebral birth trauma. (2) The traumatizing factors of primiparity, prolonged labor (2nd stage), and instrumental or version birth are of etiological significance in the causation of the deteriorating psychoses. (3) Post-natal head trauma appears to act as a primary factor in some instances, but usually acts as a major precipitating factor in the causation of the deteriorating psychoses. (4) A high incidence of neuropsychiatric conditions was found in the families of the patients as compared to the control group. (5) In 50 per cent of the patients two or more factors are operating and suggest that a multiple of factors are necessary to bring on such a condition. [15 min.]

2:10 P.M. *Mental Efficiency Levels Before and After Shock Therapy.*

MARY PHYLLIS WITTMAN, Elgin State Hospital, Elgin, Illinois.

This is a study of the mental efficiency levels of 170 psychotic patients before either insulin or metrazol therapy compared with their mental efficiency levels after therapy.

A psychometric battery of ten tests, selected or devised as measures of memory comprehension, association, orientation and speed of response, have been given before therapy and an alternate test battery after therapy. In addition, attitude scores before and after therapy have been secured by combining the attitude ratings made by the examiner during the test periods with the ratings made by the charge nurses on the treatment services.

Differences in before and after therapy scores on each of the ten efficiency tests have been studied, and correlated with changes in attitude following therapy. The relationships between the psychiatrists' evaluations of therapy results and the psychological measures of changes in efficiency and attitude following therapy have been determined. The possibility of treatment damage to the central nervous system as indicated by a decrease in mental efficiency following therapy has been investigated and Platner's findings of an amnesic syndrome following combined insulin and metrazol therapy compared with our findings.

The major results of this study include:

- A. A definite and statistically reliable improvement in mental efficiency following therapy when contrasted with mental efficiency before therapy.
- B. A high correlation between change in mental efficiency following therapy and change in attitude following therapy.
- C. A rather low but positive correlation between the psychiatrists' evaluation of therapy results and the differences in before and after therapy scores.
- D. A fairly high positive correlation between the psychiatrists' evaluations of therapy results and changes in attitude following therapy.

Suggested explanations for the above findings and plans for further study are given. [15 min., slides.]

2:30 P.M. *A Clinical and Comparative Study of Hysterical Psychopaths.*
CATHARINE C. MILES, Yale School of Medicine.

Personality profiles of 25 adolescent and young adult hysterical psychopaths have been analyzed and compared with similar data for 50 other psychopaths and 25 normal subjects in the same age and general ability range. The traits studied include the intellectual (Stanford Binet, Otis speed and power), emotional-social (Bernreuter), and concrete manipulative (Ferguson Form Boards). Comparisons are made in terms of total and partial scores and from factor analysis. The traits and trait relations of the hysterical subjects are examined with respect to their validity as correlates or indicators of hysterical behavior.

The results show a tendency to contrast and inequality within the individual hysterical as compared to the normal profiles. These include evidences of more than average facility and speed in certain simple, familiar performances, relatively poorer capacity for sustained and planful organization, less persistence in carrying out longer and more difficult tasks, an inclination to excessive, overt reactions to environmental demands and a larger number of emotional instability indicators. A "practical" hysterical orientation is suggested. The hysterical subjects show more resemblance to cyclothymic than to schizophrenic subjects.

An attempt is made to relate the findings to theories of the nature and development of hysterical behavior. [15 min.]

2:50 P.M. *Further Experiments of the Neurotic Pattern in Rats.*
NORMAN R. F. MAIER, University of Michigan.

The following problems have been explored in order to throw further light on the problem of experimental neurosis in rats: (1) Because of the difference in the effects of different driving stimuli (electric shock *versus* air) on the production of neurotic attacks in rats, attempts were made to determine whether this pattern could be released by appropriate stimuli applied directly. Both normal and neurotic animals were used. (2) A second question which is of vital importance is whether all rats

are susceptible to neurotic attacks. This was explored by subjecting stable animals to intensive routines of testing. (3) The problem of inheritance is also of considerable importance particularly to the clinician. Tests on the inheritance of the neurotic pattern have been initiated on a small scale and only preliminary data on this question can be reported. (4) Since brain injury both relieves as well as produces abnormalities, its relation to the neurotic pattern we have reported is of interest. (5) Finally the problem of cures must be raised.

Although data on these points are still in a preliminary state, sufficient evidence is available to indicate the trend of the results. Because these cannot be simply stated they are omitted in this abstract but will be fully presented when the paper is read. Mr. Nathan M. Glaser has assisted in these experiments. [15 min.]

3:10 P.M. *Some Theoretical Considerations Relating to "Experimental Neurosis."* STUART W. COOK, University of Minnesota.

Many investigators are simultaneously studying the phenomenon of "experimental neurosis." If at this early date in the history of the problem, agreement is reached upon certain matters of a non-experimental nature, much confusion in interpretation may be avoided. Likewise, if hypotheses arising from the common findings of previous experiments are formulated at this time, future investigations may be brought to bear more directly upon early misconceptions. This paper discusses certain problems having to do with definition, criteria for diagnosis, classification, level of explanation and comparative interpretation, and presents hypotheses suggested by the pioneer work on the problem.

In order to avoid the confusion likely to arise as a result of previous connotations of the word neurosis, "experimental neurosis" is defined so as to include *all* persistent abnormal behavior, experimentally produced. Quotation marks around the term are intended to call attention to this definition. The problem of identification of "experimental neurosis" suggests the necessity for criteria of selection; those advanced here center around a *persistent change* toward maladaptive response. The fact that different syndromes of abnormal symptoms have been observed raises the question of classification. Arguments are given for grouping in behavioral terms rather than on the basis of vaguely substantiated neurological concepts. With regard to comparative interpretation the position is taken that analogies drawn between lower and higher species on the basis of specific symptoms are likely to be misleading. Comparative analyses in terms of the normal behavior of the species and the total picture of the abnormal reaction are supported. Finally, hypotheses concerned with characteristics of the precipitating situation and the reactive predisposition of the animal are discussed together with the experimental sources from which they are drawn. [15 min.]

3:30 P.M. *Experiments Relating Freudian Displacement to Generalization of Conditioning.* NEAL E. MILLER, Institute of Human Relations, Yale University.

In the first experiment, pairs of albino rats were trained to commence striking one another, at the signal of a mild electric shock, in

a manner similar to the way in which rats strike at one another when normally fighting. This behavior was reinforced by turning off the shock as soon as the rats struck one another vigorously. After this training, a small celluloid doll was placed in the arena along with each pair of rats. Under these conditions the animals struck at each other and not at the doll. When placed *one at a time* in the same apparatus, however, they struck at the doll. A rat first attempted, in short, to strike the other animal, but when this was prevented by the absence of that animal it struck the doll. Viewed in Freudian terms this should indicate displacement; in stimulus-response terms it would be generalization of conditioning or transfer of training. (Miss Maritta Davis helped perform this experiment.)

In a second experiment, performed with the assistance of Miss Inez Aaronson, it was found that, if thirsty rats were trained to run down an alley to water and then satiated till they would drink no more, they would run down the alley faster to *water* if *hungry* than if not hungry. Similarly, with the assistance of Mr. Jacob Boldstein, it was demonstrated that animals trained to run for food and then satiated would run more rapidly to food on the correct arm of a T maze when frightened than when not frightened. Again the results can be interpreted as being analogous either to generalization of conditioning or to displacement of motivation.

Psychoanalytic observations on displacement suggest that consciousness or verbal control should have certain effects upon the generalization of conditioning. [15 min., slides.]

3:50 P.M. *Anxiety and Learning*. O. H. MOWRER, Yale University.

The efficacy of anxiety as a motivating and reinforcing agent is tacitly acknowledged in many practices commonly employed in both animal training and human education. The principles involved in these practices have not, however, been subjected either to refined theoretical analysis or to carefully controlled laboratory investigation. In laboratory learning experiments with adult human subjects, the factor of motivation (and reinforcement, conceived as the response-fixating influence of motivation reduction) is usually defined vaguely, if at all; whereas, in animal experiments motivation is usually too narrowly defined, being limited to hunger, thirst, sex, electric shock, or the like. Anxiety, defined as anticipation of painfully intense stimulation (of either external or internal origin), appears to exercise an important influence in actually shaping human and infra-human behavior alike. Explicit recognition of the psychological importance of anxiety offers the hope of bridging the gap between so-called normal and abnormal behavior, of accounting for many now perplexing social phenomena, and of eliminating some of the contradictions and imperfections of current learning theory.

In the present report, an attempt will be made (1) to state certain principles concerning the conditions of anxiety formation and anxiety dissipation, (2) to formulate a few major predictions that derive from these and correlative psychological principles, and (3) to describe some experimental investigations that have been aimed at testing the validity of these predictions.

Reference will also be made in passing to some of the difficulties, both systematic and practical, that arise (1) in connection with the detection and independent measurement of anxiety and (2) in connection with the use of animal subjects in experimentation of this kind. [15 min., slides.]

ANIMAL LEARNING

Monday, September 4, 1:30 P.M.

Room 521, Hydraulic Laboratory

EDWARD C. TOLMAN, Chairman

1:30 P.M. *A Further Study of One Trial Learning in Rats.* BRADFORD B. HUDSON, University of California.

In a preliminary experiment, rats were shocked once on the mouth by a condenser discharge as they ate from a metallic food holder, attached to the center of a black and white striped cardboard pattern. The bait used was their regular diet, moistened instead of dry. Monthly tests, without reinforcement, revealed good retention of fear in several rats for six months.

In the present experiments two variables were investigated for their effects on the learning and retention of this single experience: (1) The effect of age at the time shocked; (2) The effect of the size of the temporal intervals interposed between the shock experience and the start of the series of daily test trials.

Rats, 30, 50, and 70 days of age, were shocked in their living cage and then tested daily for five minutes, beginning two weeks later. Their regular diet was always available except during the shock and test trials. In these groups, 47, 43, and 14 per cent, respectively, failed to show the characteristic "caution" in their approaches to the bait or the equally significant withdrawal responses. Of those rats which both learned and showed retention over this period, the average number of trials required to produce extinction was 3.0, 3.2, and 3.5, respectively.

These trends become significant when considered in conjunction with the results of a comparable group No. 1 in the study of the second variable, the effect of time intervals. Two groups, age 240 days, but in this case motivated, were shocked and then tested daily, beginning at 2 and 6 weeks respectively. In group 1, 100 per cent learned and resisted extinction for an average of 10.6 days. In group 2, 78 per cent learned and resisted extinction for an average of 3.4 days. [15 min., slides.]

1:50 P.M. *Learning Ability of Rats Cured of Rat Pellagra.* D. E. SMITH and L. B. PETT, University of Alberta.

In some studies of the effect of a diet deficient in the vitamin B₂ (G) complex, the learning ability of deficient animals was significantly

inferior to that of normals; in others this was not found. These differences in results are associated with differences in duration of the deficient diet, and may have been due to variations in the extent of recovery. The present study proposed to investigate the learning ability of rats in which suitable recovery from the effects of the vitamin deficiency was attained before learning began.

Seventeen rats in the control group were fed from weaning a complete, purified diet. Twenty-six rats in the experimental group were fed from weaning a similar purified diet, deficient only in vitamin B₆, until the symptoms of rat pellagra (growth retardation, scaly dermatosis, etc.) fully appeared. Massive doses of the vitamin were then added to the diet. When the animals of the experimental group attained two-thirds the average weight of the control group, and other symptoms of deficiency had disappeared, both groups began training on a 4-unit water maze. The groups were equated as to sex, and the split-litter technique was employed.

The two groups were equal in learning ability, as measured by the total number of trials required, and the total number of errors made.

These results suggest that any loss of learning ability which may occur in deficiency of the vitamin B₂ (G) complex or its components is restored when the animal recovers from other effects of the deficiency. Therefore, placing the animals on a normal diet before learning is complete, complicates in an uncontrollable manner studies of such loss of learning ability. [15 min., slides.]

2:10 P.M. *Transfer of Training in the Mastery of an Antagonistic Habit After Varying Intervals of Time.* M. E. BUNCH, Washington University.

The question investigated is whether or not the negative transfer effect shown in the learning of a second of a pair of tasks is a function of the amount of time elapsing before the second is learned. Simple right and left position habits in a one unit "T" water maze were chosen as the problems to be learned because of the readiness with which white rats establish such habits and the very great likelihood of the occurrence of negative transfer in learning the second task immediately following the first. Each task was learned by the method of massed practice. The amount of the detrimental influence, or negative transfer, that occurs when the two are learned in immediate succession is determined and compared with the amount and character of the transfer effect that occurs under different temporal conditions. The intervals of time after which the transfer effect from the first to the second was measured are: immediate succession, 2, 7, 14, and 28 days.

The results indicate that the negative transfer effect of the first habit on the second when the two are learned in immediate succession decreases rapidly with the passage of time and becomes positive in character after intervals of 14 and 28 days. Thus, whether the first of a pair of antagonistic habits actually interferes with the second is a function of the interval of time between them.

The relation of the results to the studies of the transfer-time question involving a positive transfer effect from the beginning will be discussed. [15 min.]

2:30 P.M. *Rate of Extinction in Maze-bright and Maze-dull Rats.* W. T. HERON and B. F. SKINNER, University of Minnesota.

The following experiment tests the assumption that differences in maze performances are due in part to differences in the rate of extinction of "wrong" responses. Fifty maze-bright and forty-five maze-dull rats, both male and female, of the F_{14} generation segregated on the Minnesota automatic maze, were tested for differences in rate of responding under periodic reinforcement and in the rate of subsequent extinction. The response studied was pressing a lever; the reinforcement was with food. A new apparatus permitting the simultaneous study of twenty-four rats was used. Approximately equal numbers of bright and dull rats were compared in four experimental sub-groups. Records were analyzed graphically and statistically. The rate of responding under periodic reinforcement, previously shown to vary with hunger, exhibits a significant difference between males and females in favor of females and between some of the sub-groups of bright and dull rats. The mean extinction curve for the whole group is typical of the process of extinction as previously reported. The probability that the bright and dull rats were drawn from different populations with respect to rate of responding during extinction passes the .05 level in some sub-groups in favor of a greater rate for the bright rats. But this is also the direction of the difference in rate under periodic reinforcement, and both differences are probably due simply to the different degrees of drive obtained in the two strains with a common method of feeding. The negative acceleration during extinction is not significantly different. The curves can be superimposed with the aid of a slope factor. The difference in maze performance cannot, therefore, be due to the rate of extinction. Although other aspects of learning remain to be tested, the experiment suggests that motivation may be a more important factor. [15 min., slides.]

2:50 P.M. *Analysis of Learning Data Using Psychologically Meaningful Parameters.* HAROLD GULLIKSEN, The University of Chicago.

When individual learning curves are fitted to discrimination learning data (e.g., light-dark discrimination), three psychologically meaningful parameters of the individual learning curves may be calculated. These parameters lend themselves more readily to psychological interpretation than do the usual scores of total time, total errors, or total trials. These three parameters are measures of: (1) initial preference (e.g., preference for the light or for the dark); (2) a criterion of degree of learning; and (3) the individual's learning ability.

These individual learning curve parameters were used in analyzing some data obtained by Krechevsky. Comparisons are made between groups of normal and of operated animals trained on a light-dark discrimination. This analysis shows the effect of punishment and of cortical operation on learning ability and on initial preference. [10 min.]

3:05 P.M. *A Further Study of the Cat in the Puzzle-Box.* GEORGE PLANT HORTON and EDWIN R. GUTHRIE, University of Washington.

The authors have previously reported that the escape-movements of animals from a puzzle-box demonstrated habits which were stereotyped to an extent not formerly emphasized in discussions of this problem. To answer the question of what conditions lead to the stereotyping of the escape-responses three different release mechanisms were employed. In the first condition release was effected by tilting a vertical pole in any direction; in the second condition release was effected by cutting the light beam of a photo-electric cell as the beam passed through the *only* hole in the floor of the box; in the third condition release was effected by cutting the light beam of a photo-electric cell as it passed through *one* of the *many* equally spaced holes in the floor of the box. Since, for photographic purposes the box was illuminated with three 1,000 watt photoflood bulbs, the beam of the photoelectric cell was not discernable. The records consisted of direct observations by the experimenters, of *one* continuous and several discontinuous motion pictures, and of still photographs of the escape movement obtained by a camera operated electrically by the release mechanism.

The first two conditions offered the animal more orienting stimuli than did the third. The responses obtained under these two conditions showed greater stereotyping in the still pictures than did those obtained under the third condition. However, the experimenters' observations and the cinematographic records showed many highly stereotyped serial responses in all cases. The still pictures being only a cross-section of the total action had failed to demonstrate these responses in the third condition. Reasons for these differences in the still pictures will be discussed. [15 min., slides.]

3:25 P.M. *An Apparatus for the Study of Alternation Behavior in the Cat.* WILLIAM E. KAPPAUF, University of Rochester.

A lever-type apparatus has been developed for the study of alternation behavior in the cat. Two pedals are arranged in the response box and the animal is required to press them in the order RLRL, or RRLL, etc. A correct response to either pedal involves pushing it to the floor through a distance of about 20 mm. The animal receives a shock if it presses one of the pedals out of sequence. Food is delivered at a position midway between the two pedals after each correct response or, if desired, only upon the completion of a series of required responses. The apparatus is automatic in operation, the alternation, shock and feeding being controlled through a set of rotating selector switches.

Preliminary results on the training of a group of six animals will be reported. [10 min., slides.]

3:40 P.M. *Symbolic Reactions for Delayed Reward and Delayed Response in Chimpanzees.* AUSTIN H. RIESEN, Yale Laboratories of Primate Biology.

A critical review of the literature on animal learning fails to reveal any instance of successful discrimination learning with delayed reward

when the stimuli involved lacked differentiating spatial components. Non-positional delayed response has never been demonstrated in animal subjects except after special and prolonged training. Hypotheses are formulated to account for facts of learning with delayed reward and performance of delayed response. Certain predictions as to the outcome of visual discrimination learning with delayed reward by trained and untrained chimpanzee subjects are made.

A discrimination apparatus is described which provides for the equalization of frustration of delay while making possible variation of the interval between the disappearance of the visual stimuli and the occurrence of reward or frustration. Control subjects were found incapable of learning successive red *vs.* green and green *vs.* red discrimination habits when the differential response to the color stimuli was followed by the reward or frustration consequences of the response at an interval greater than 2 or 4 seconds. Experimental subjects received special training designed to establish symbolic reactions (specific anticipatory eating movements) to the color stimuli. Following such training, rate of learning by these animals was independent of the interval of separation between differential response and reward or frustration. Intervals up to 20 seconds were used in tests. Learning was extremely rapid, many habit reversals being learned with no errors occurring after an initial trial, which was sometimes a rewarded and sometimes a frustrated choice.

The results, which parallel instances of one-trial learning mediated by speech symbols in human subjects, are in agreement with the hypotheses concerning the symbolic nature of reaction habits essential to delayed reward learning and delayed response performance. [15 min., slides.]

TESTS AND MEASUREMENTS

Monday, September 4, 1:30 P.M.

Auditorium, Education Building

FRANK N. FREEMAN, Chairman

1:30 P.M. *A Study of Personal Variation in Hand-Arm Steadiness.*

CONSTANCE LOVELL, The University of Southern California.

As a preliminary study of the value of measures of personal variation in describing individual performance, hand-arm steadiness tests were made for fifty university students to determine (1) if degree of personal variation was specific to the time interval used in calculating results and (2) if the variation found in each individual's series of trials would be relatively consistent over a period of time. The Seashore Photo-Electric Target Register, a device for the measurement of steadiness, was wired for kymograph recording to allow for the division of each trial into fractional parts. Results computed in terms of three different time periods indicated that variation was not highly specific to time interval. Correlations between the variation in two series of trials, a month apart, ranged from $+0.49 \pm 0.08$ to $+0.74 \pm 0.05$ (depending on the measure selected). [10 min.]

1:45 P.M. *A Test Standardized on Pueblo Indian Children.* PHILIP H. DuBois, University of New Mexico.

Most of the comparisons of the abilities of Indians and whites have been made with tests utilizing material common in white culture and standardized on white groups. In this study the procedure has been reversed.

Practically all of the children in 26 of the 27 day schools of the United Pueblos Agency were asked to make two drawings, one of a horse and the other of a man. Sex, age and grade placement of each subject were recorded and each was rated by the teacher for general intelligence.

For 955 subjects information regarding age was exact. Their horse drawings were scored on an *a priori* scale of 73 points, devised by analogy with the points of the Goodenough Intelligence Test. Of the 73 points, 60 showed fairly regular increases in the percentage of children succeeding with the point at successive ages and were retained in the revised system of scoring.

Reliability as determined by the correlation of two sets of 30 items ranged from .64 for 4-year-olds to .90 for 9-year-olds, when the age groups were considered separately. Reliability was also established by the test-retest method.

Validity was established by correlation with grade placement and other criteria. For Pueblo Indian children the horse drawing test seems to have greater validity as a measure of mental ability than the Goodenough.

Sex differences are considered. Attainment of groups of white children on the test is also given. The assistance of Miss Marian Eller is acknowledged. [15 min., slides.]

2:05 P.M. *Results from the Use of Special Tests for Automobile Drivers.* CLARENCE W. BROWN, University of California.

In recent years conflicting reports have been made concerning the value of psychological tests for automobile drivers. Misunderstandings have arisen because a few workers in this field have made claims for the tests which are primarily traceable to the workers' personal zeal rather than to an adequate body of experimental fact. Furthermore, progress in evaluating the tests has been slow because a record, over a period of several years, of certain driving habits of a large number of tested and untested drivers has not been available for analysis.

For the past three years the state of California has administered a battery of psychological tests to a large number of drivers. Eighteen different measures on special sensory and motor tests, together with facts of personal history were obtained from each driver. Two general procedures were used for evaluating the tests. In the first, the capacity of the tests to measure driving ability was ascertained by comparing the performances on the tests of groups of good and poor drivers. In the second procedure the actual road performances of tested and non-tested drivers were compared both before and after the administration of the test.

Two general conclusions seem warranted by the facts: (1) certain

of the measures reliably differentiated between groups of good and poor automobile drivers, and (2) the administration of the tests caused a marked improvement in the driving performance of those tested. [15 min.]

2:25 P.M. *A Factor Analysis of Mechanical Ability Tests.* WILLARD HARRELL, University of Illinois.

Mechanical aptitude tests were given to ninety-one cotton mill machine fixers. Results were treated by the Thurstone centroid method of factor analysis.

The Minnesota tests of mechanical ability, the MacQuarrie test of mechanical ability, Wiggly Block, and Stenquist I picture matching test were included along with thirty other variables. Other manual and spatial tests, verbal tests, and personal data composed thirty variables chosen to aid the identification of factors guessed to be present in the above tests.

Five factors were isolated, these were: perception of detail (P), verbal relations (V), visualizing spatial relations (S), manual agility (A), and youth (Y). Identification of P is the least certain of the five. The first three of these factors, P , V , and S , have previously been identified by Thurstone and others. Oblique axes were used since the abilities, at least for the group studied, are correlated.

The Minnesota tests comprise not merely one group factor but two, P and S , while A is present to a high degree in one of the putative mechanical ability tests—the MacQuarrie dotting sub-test. Inclusion of other variable might show other factors in “mechanical ability” tests but the representative nature of the present battery indicates that P and S are the most important.

Certain group paper-and-pencil tests measure each of the factors present in the manual tests.

The results contain a suggestion that insight into mechanical relations is bound up in factor S , while factor P is more routine. This indication comes from the dropping out of S which was present in the assembly test, when the test was repeated, leaving only factor P . This conclusion, however, is not definite, as the test was scored the first time for accuracy, and the second time for speed. [15 min.]

2:45 P.M. *A Comparative Study of Retest Ratings on the Original and the Revised Stanford Binet Intelligence Scales.* GRACE MUNSON and MILTON A. SAFFIR, Bureau of Child Study, Chicago Public Schools.

The publication of the Revised Stanford Binet has raised the question of the comparability of the ratings on the revised and the original scales. The revision has also added new opportunities for studying the constancy of the I.Q. The authors have studied these questions through analysis of the results of the use of each of these scales for retesting two groups of children—approximately 1,000 children in each—using the old Stanford Binet for the first test. All of the retests as well as the first tests were administered by trained psychologists. The children tested were

referred because of school problems. The statistical constants indicate that the two groups were very similar, and for the most part the I.Q.'s were in the 50-100 range.

Comparison of the two scales used for the retest has been made both through test-retest correlations, and by the study of the amount and direction of change in I.Q. The data were classified to study the change in I.Q. with each of the tests as related to original C.A., time interval between test and retest, and original I.Q. level.

Analysis of the results indicates a drop in I.Q. for retest with either scale, but a smaller drop when the Revised Stanford Binet was the scale used. The drops found were less than those previously reported or predicted. Change in I.Q., ignoring *direction* of change, is no greater with the revised scale than with the original one. Significant data were found concerning the relationship of change in I.Q. to such factors as C.A. at time of first test, I.Q. level, and time interval between tests, for retest with the new as well as the old Stanford Binet. [15 min., slides.]

3:05 P.M. *Further Data on the Measurement of General English Vocabulary.* ROBERT H. SEASHORE, Northwestern University.

Extensive studies with a shorter revision (Form 1) of the Seashore-Eckerson General English Vocabulary Test indicate that:

(1) *Unabridged* dictionaries are necessary to provide an adequate sampling for the measurement of the total size of individual vocabularies.

(2) Such a dictionary (Funk and Wagnalls) contains approximately 167,000 *basic* (marginal, heavy type) entries, plus 204,000 *derivative* (other parts of speech, compound words) entries, or a total of 371,000 words. The remaining 87,000 multiple meanings and 13,000 variants in spelling are not ordinarily considered separate words.

(3) The average college undergraduate can *recognize* the commonest single meaning of approximately 61,000 basic and 96,000 derivative words, or a total of 157,000 words. He can *use* about 153,000 of these in illustrative sentences.

(4) The *use* vocabularies commonly cited for famous authors (Shakespeare, 15,000 words) have not counted derivatives as separate words. Neither do they take into account additional words which the writers *could have used* on topics other than those included in their formal writings. The English language was also much smaller at the time when Shakespeare wrote.

(5) Knowledge of the single commonest meaning of a word is related to knowledge of additional multiple meanings of the same words. ($r=.68$.)

(6) Additional data include measurements of reliabilities, college norms for 20 minute and unlimited time conditions, intercorrelations with tests of reading comprehension, reading speed, language usage, general intelligence, and college grades, and preliminary results with grade school children.

Lois D. Eckerson, Raymond Starman, and George D. Lovell have collaborated in these studies. [15 min.]

- 3:25 P.M. *The Measurement of Visual Depth Perception.* NEIL WARREN, University of Southern California.

Correlation of the results obtained by measuring the same subjects with two standard tests of binocular depth perception indicates that the tests do not give equivalent measures. While the ocular features of the two procedures are fundamentally similar, certain extrinsic factors influence the results. The lack of correspondence between the tests, both of which are widely used, raises questions about the practical values of such measurements.

Consideration is given to the nature of individual differences in visual depth perception and to the principles upon which tests for such differences should be designed. [10 min.]

- 3:40 P.M. *The Relationship of Single Binocular Perception to the Stimulation of Retinal Corresponding Points.* ELEROY L. STROMBERG, Oklahoma A. & M. College.

Previous evidence presented by the author indicates that the two eyes do not necessarily fixate upon the same point in the printed line during reading. Frequently, the variation is as much as ten or twelve letter spaces. In the same line of print, the fixation points often reverse their relative positions. That is, whereas the left eye leads at the beginning of the line, the right eye may be the leading eye at the end of the line.

This variation in fixation points suggests either that: (1) The stimulation of corresponding points of the retinae is not necessary for single binocular perception, or that, (2) Vision is suppressed in one eye during reading perception.

These data support the former conclusion. [10 min., slides.]

- 3:55 P.M. *Interrelationships among Criteria of Reading Ability and Measures of Visual Functions.* HUBERT C. ARMSTRONG, Institute of Child Welfare, University of California.

The problem is to determine which visual functions are associated with reading disability. Standardized tests were used to measure reading ability and mental maturity. Visual functions were measured by (1) standard optometric instruments, (2) eye movement photography, (3) the haploscope, and (4) a calibrated stereoscope with standard cards. The measures obtained with the number of methods employed shown in parentheses included: visual acuity (2); refractive error (1); vergence (3); fixations (1); speed (1); binocular fusion (1); accommodative convergence relationships (3); stereoscopic vision (1). The results, which are at this writing incomplete, include (a) statements of remeasurement reliability. Correlation coefficients range from .00 to .80; (b) interrelationships of ocular variables with the criteria are generally too low to be significant. Selected positive relationships will be presented. [10 min.]

- 4:10 P.M. *A Test for Types of Formal Creativity.* ERNST HARMS, U. S. Department of Agriculture, Washington, D. C.

Can we test the formal creativity expressed in any artistic activity and distinguish clear types? Three thousand and five hundred children

(three age groups 6-9, 10-14, 15-18) of New York City, 200 students of George Washington University, Washington, D. C., and 600 adults were tested by giving them series of 10-15 suitable words (mostly various actions) to express their contents in a single line. This test was repeated with the same individuals and varied for getting clear definite information.

There could be for all age stages distinguished five general types (1) symbolic: walking-footprints, love-heart; (2) spacial: positive-up, negative-down; (3) propensitive: final directed; (4) typographical: short typelike lines; (5) monographic: slight variations of a similar line. Further types: (a) fantasiful: for everything on other formal expression; (b) fantasiles: monotone similar lines; (c) neurotic: about which a special publication will be prepared.

Average (approx.) for all ages: 25% symbolic, 15% spacial, 15% propensitive, 10% typographic, 10% monographic. Rest unclear. Symbolic higher among children under 10 and among adults over 25. Tired children lean to symbolic. Spacial and propensitive highest at 15-25. [15 min., slides.]

RESEARCH AND INSTRUCTIONAL FILMS

Monday, September 4, 8:00 P.M.

Auditorium, Education Building

HAROLD E. JONES, Chairman

Note: The showing of films will not be accompanied by verbal descriptions, since proper titles in the films will be adequate.

Song-Isolated Roller Canaries. MILTON METFESSEL, University of Southern California. [Sound, 15 min.]

Experimentally Produced Neurotic Behavior in the Rat. NORMAN R. F. MAIER, University of Michigan. [25 min.]

Symptoms in Schizophrenia. JAMES D. PAGE, University of Rochester. [25 min.]

An Experimentally Produced "Social Problem" in Rats. O. H. MOWRER, Yale University. [8 min.]

One Trial Learning in Rats. BRADFORD B. HUDSON, University of California. [10 min.]

Testing Animal Intelligence. CARL J. WARDEN and G. M. GILBERT, Columbia University. [18 min.]

The Neurophysiological Integration of the Starfish. WILBER S. HULIN and ARTHUR R. MOORE, University of Oregon. [10 min.]

Artificial Oestrus in the Guinea Pig Without Ovaries and Uterus. JOHN P. SEWARD, Connecticut College. [5 min.]

A Motion Picture Study of Behavior of Cats After Frontal Lobe Lesions. KARL U. SMITH, University of Rochester. [10 min.]

Instruction in Animal Psychology. WILLIS D. ELLIS, University of Arizona. [10 min.]

Experimental Studies of the Learning Process in Children. HAROLD E. JONES, University of California. [15 min.]

PSYCHOMETRICS

Program Arranged by the Program Committee of the
Psychometric Society

Tuesday, September 5, 9:00 A.M.

Room 2, Education Building

LEWIS M. TERMAN, Chairman

9:00 A.M. *Selecting Salesmen by Personal History Items: Methods and Results.* ALBERT K. KURTZ, Life Insurance Sales Research Bureau, Hartford, Connecticut.

Twenty-three personal history items (occupation, number of dependents, living expenses, etc.) were studied to determine their value, singly and combined, for predicting success in selling life insurance.

Two criteria (whether or not the salesman remained in business at least one, or two, years) related to turnover; and two (total life insurance sales in first one, or two, years) related to selling ability of survivors.

A scoring system, based on all four criteria, was developed for each item. Six items, which individually showed high validities, formed a preliminary rating chart. Seventeen remaining items were added in turn, and the 68 possible correlation coefficients (based on approximately 500 to 3,000 cases) were computed between every such 7-item rating chart and each criterion. Four more items which raised validity coefficients by relatively large amounts were included, forming the 10-item *Rating Chart*.

Each of 10,111 salesmen was scored on this 10-item *Rating Chart*. Boundary lines for *Rating Chart* scores were set up for each age so men classified in, for example, the *B* group, would average a certain predetermined amount of first year sales—regardless of their age.

The effectiveness of the *Rating Chart* is shown by figures on both the original 10,111 salesmen and two alien populations of 743 and 878. The proportion of men with *A* ratings on the *Rating Chart* who continue working at least one year is nearly double that of *E* men. Of survivors, average sales of *A* men are triple those of *E* men. Consequently, total first year sales are five times as great if *A*, rather than *E*, men are hired.

Time for answering *Rating Chart* questions: 10 minutes; scoring time: 5 minutes.

Dr. Rensis Likert made many valuable suggestions regarding analytical procedures. [15 min., slides.]

9:20 A.M. *Improved Cluster-Orthometrics.* ROBERT C. TRYON, University of California.

An improved technique for estimating communalities is made available, one involving the use of the expression: $\Sigma r_{ak}/\Sigma r_{bk}=h_a/h_b$, for the congruent variables, a and b . The orthometric analysis of the augmented correlations is abandoned in favor of a new technique in which the coordinates of each test are determined from the unaugmented correlations, the operations being focused around certain *key centroid tests*. Orthogonal axes, which may exceed three, are successively introduced until mean residual correlations between the key centroid tests vanish within their standard error, the formula for which is presented. Tests of goodness of fit are thus carried along routinely with the analysis. Computational work is minimal, requiring for a twenty variable problem, for example, only two sheets of mechanic's bond. For a pictorial and quantitative description of the relationships between test clusters, geometric figures of three or less dimensions are employed, the tests being depicted in terms of their augmented coordinates. Where the number of axes exceeds three, different "alternative" orthometric figures, derived from simple rotational procedures, are employed. In each figure the augmented total variance of the tests there depicted is unity, and no test of fit is required in contrast to the earlier method. Thus the entire organization of test clusters, whatever the number of orthogonal axes required in the analysis, is made visually apparent and is quantitatively described in alternative spaces of three dimensions. [15 min.]

9:40 A.M. *Measuring Interests.* JOHN C. FLANAGAN, Coöperative Test Service, New York City.

One of the earliest systematic attempts to measure interests was that of Truman Lee Kelley, reported in his monograph, *Educational Guidance*, twenty-five years ago. Since that time, many other investigators have contributed to this field. The progress made by these investigators is probably best illustrated by the Strong Vocational Interest Blanks. The scores on these scales are determined by the individual's *expressed* preferences. Such responses are likely to reflect wishful thinking, or "expected" answers.

The present report describes another approach to the measurement of interests. A test composed of items in six major fields measuring the extent to which information concerning events of the preceding year has been acquired and retained was administered to several groups, principally college sophomores. The profile of relative scores provides measures of the concrete results of actual interests operating over a period of time and, therefore, reflects functioning interests in terms of objectively measured results. The pattern which becomes apparent when the student's six sub-scores (expressed in comparable units) are compared will give an indication of the pattern of his relative interests in these fields as evidenced by measures of the results of his actual behavior during the past year.

To study the validity of these measures, the results on the test were compared with other data, such as statements of: Field of major interest,

Types of activities in which the individual is most interested, Reading preferences with respect to selected periodicals, Professional goal, Major field of study, and scores on achievement tests and the Strong Vocational Interest Blank. A summary of the findings is reported. [15 min.]

10:00 A.M. *Sampling in Factor Analysis.* QUINN McNEMAR, Stanford University.

In order for the factorial methods to be more useful it is necessary that we know something about sampling errors as they affect the dependability of axes, the stability of test projections on the axes, and the number of factors to be extracted. Different factorial patterns derived from different groups, or produced experimentally (*e.g.*, by practice), or found by following the same group from one age to another, cannot at present be adequately evaluated in terms of sampling variations. It is the purpose of this paper to present empirical data on the stability of test projections. 'Scores' for 2,500 'individuals' on seven 'tests' were set up in terms of known common elements in such a way as to permit the following combinations: six tests with three factors, five tests with two factors, and five tests with one factor. For 25 subexamples of 100 each, three sets of analyses, according to the above combinations, were carried out. This report is concerned primarily with the results from these artificial data. Another study involving nine variables is in progress in which 35 sub-samples of 200 each have been drawn from a supply of 7,000 College Entrance Examination Board blanks. The general findings for the completed part of this second study will be indicated. [15 min., slides.]

10:20 A.M. *Two Statistical Notes.* TRUMAN L. KELLEY, Harvard Graduate School of Education.

The idea that the variability of a sample of means may be estimated from a single sample of subjects giving a single mean is, historically, of rather recent origin. There is need for the teaching of this concept, as a type concept, early in a course in measurement. The writer has always found difficulty in presenting the subject to beginning students. Herein is a somewhat novel derivation of the formula $\sigma_M = \sigma / \sqrt{N-1}$ which may have some merit in connection with elementary instruction.

The standard error of a multiple regression coefficient is not readily given by the constants derived in the usual abridged methods for determining regression equation constants. Herein are presented certain procedures and approximation formulas for quickly obtaining serviceably close estimates of the standard errors of multiple regression coefficients. [15 min.]

10:40 A.M. *The Limits of Random and Systematic Practice Effects.* EDWARD B. GREENE, University of Michigan.

A correction for attenuation, using a correlation between supposedly equivalent forms, is often recommended on the assumption that low correlations indicate random variations in scores. This assumption may be in error to a marked degree, for systematic variations are often present.

Results of one experiment were analyzed to determine the limits of systematic variations. Four trials of six tests of motor abilities and six

of comparison were given to 394 high school boys. With practice all of the tests showed marked and related changes in mean scores, standard deviations, coefficients of variation, correlations between adjacent trials and factor loading patterns. These results, together with subjective reports, indicate large systematic variations in performance. The conclusion is reached that corrections for attenuation are unjustifiable when based on data similar to those discussed. The probable limits of random and systematic variations are outlined for three commonly met situations. [10 min.]

SOCIAL AND POLITICAL PSYCHOLOGY

Program Arranged by the Program Committee of the Society for the Psychological Study of Social Issues

Tuesday, September 5, 9:00 A.M.

Auditorium, Education Building

KURT LEWIN, Chairman

Fifteen minutes allowed for discussion of each paper.

9:00 A.M. *A Socio-Psychological Case Study of an Institutional Crisis: A Methodological Exploration.* GOODWIN WATSON, Teachers College, Columbia University.

How does the psychologist, as distinct from reporter, historian or sociologist, analyze complex social processes? Few models can be found in the literature. A case study is here attempted of the three months of excited activity which followed the announcement that New College would be discontinued. In some respects that pattern of events paralleled, on a small scale, the course of attempts at political revolution. Time sequences, records of group meetings, interviews with all leaders concerned, and extensive personal data concerning many participants, have been studied to discover social psychological patterns, relationships and hypotheses. The central purpose of the paper is methodological, and is concerned to find techniques of analysis that may prove fruitful in further study of the psychology of social change. [15 min.]

9:30 A.M. *A Critique of the Telic Continuum and the J-Curve Hypothesis.* ARTHUR JENNESS, University of Nebraska.

The concept of the telic continuum has made possible greater precision in the definition of norms of behavior and of the degrees of conformity to these norms which prevail in given populations. Ambiguity still arises from two confusions: (1) the telic continuum is sometimes considered as one of degrees of fulfillment of the purpose of the act and sometimes as one of degrees of conformity to a rule, (2) some writers consider the term "norm" to be synonymous with "frame of reference." A conceptual system will be offered which embraces all of these concepts, but overcomes the difficulties mentioned.

The J-shaped distribution is not peculiar to institutional behavior; the data of clinicians and physicians demonstrate that the shape of the dis-

tribution may be due to the manner in which the criteria of behavior are selected. Allport contends that the double J-shaped curve is positively accelerated on both sides and is not an ordinary skewed curve, since the latter is negatively accelerated as it approaches the mode. In some of Allport's double J-curves, the lack of negative acceleration is an artifact of his statistical technique.

Where the prescribed behavior is represented on an "empirical" continuum (*e.g.*, arriving at work on time), the mode of the distribution frequently falls at a point above or below that stipulated in the rule. In such cases the curve may be considered as a curve of errors in approximating the prescribed behavior. Thus the modal time of arrival at work is usually before the stipulated time; this may be considered as a constant error, the magnitude of which is a function of the severity of the penalty for late arrival. [15 min., slides.]

10:00 A.M. *Selection for and Contagion of Paranoia in Organized Groups.* HARRY C. STEINMETZ, San Diego State College.

The purpose of this paper is to delineate paranoid condition in such terms as shall aid in distinguishing between supporters of a movement whose motives, however derived, are under the direction of principle and analysis, and those whose motives, ushering them into a congenial movement or derived from its development, are unamenable to such control. Normalcy, in its medical connotation for psychology, is relevant to functional group membership. Misunderstood and loosening bourgeois relationships cultivate paranoid conditions in relief from conflict and uncertainty (*Mein Kampf*, "the curse of objectivity") and, conversely, bourgeois intellectuals can readily classify as paranoid those whose insight reveals the conspiratorial nature of social controls, who rise above decadent cultural limitations. Conspiratorial activities foster the symptoms, and these induce the condition. The sources are psychiatric and fascist literature, together with experiences in political and labor groups, and study of institutional cases. A significant cue is to be found in a compulsive self-exemption from group obligations from a projected delusion of unique worth. [15 min.]

10:30 A.M. *The Analysis of the Programs and Effectiveness of Peace Societies.* RALPH H. GUNDLACH, University of Washington.

The programs of about 30 peace and patriotic societies were examined and tabulated, and their answers to the SPSSI committee on war and peace questionnaire tabulated. The analysis converts the material into definite statements of policy upon topics of Foreign Affairs, Profits of War, Preparedness, Domestic Problems, and recommendation for Personal Action. From a survey of the data, it is possible to compare the various societies in terms of the composite program of all peace societies, and to rank them with regard to their extent and quality of action. It also becomes possible to evaluate what are considered to be the important and the unimportant items by the various societies, in preserving the peace, and to compare these recommended policies with the course of American policy. [10 min.]

10:55 A.M. *A Survey of Social Scientists' Opinions on Methods of Preventing War.* ROSS STAGNER, Dartmouth College, and J. F. BROWN, University of Kansas.

In an attempt to reach a consensus of opinion among experts on controversial topics relating to war prevention, a questionnaire was sent to 375 prominent persons in the fields of history, economics, sociology and political science. For the most part persons who had done previous work on war were selected. A heavy majority were college teachers. One hundred and forty-two answers were received in form suitable for tabulation.

Quantitative results: greatest agreement was shown on such questions as opposition to economic nationalism and high tariffs (almost unanimous), education to understand foreign viewpoints and foreign ideologies were rated next; then opposition to fascist tendencies in this country and the strengthening of organizations such as the World Court. Proposals which were rated as possible *causes* of war were: national self-sufficiency; opposition to economic collectivism; Ludlow referendum; build world unity through the working class and Soviet Russia; maintaining trade with other countries during war; and increasing our military strength.

Qualitative results: some of the experts emphasized, both in their ratings and in free comments, the importance of political solutions (international organization); others favored psychological solutions (tolerance and education). In general, this bias followed the field of specialization of the individual.

Some subjects endorsed specific wars, while deprecating wars in general, *e.g.*, class war was abhorred by some, approved by others. Some "would rather fight than have a lot of x's here," referring to proposed relaxation of exclusion acts.

The presence of stereotyped reactions is indicated by divergences in answers to questions covering practically identical material, with and without stereotyped phrases.

The results are interpreted as indicating that decreases in economic, military, political and psychological nationalism would, in the opinion of these experts, work in the direction of war prevention. R. K. White and R. H. Gundlach assisted in the survey. [15 min.]

PHYSIOLOGICAL PSYCHOLOGY

Tuesday, September 5, 9:00 A.M.

Room 521, Hydraulic Laboratory

FRANKLIN FEARING, Chairman

9:00 A.M. *Recovery Sequence After Anesthetization with Ethyl Alcohol.* ALBERT C. CORNSWEET, University of North Carolina.

This study educed further evidence of caudo-cephalad induction and cephalo-caudad recovery upon anesthetization with gaseous ethyl alcohol. The behavioral patternings were of similar sequences noted in studies of developmental sequences. Thirty white rats were used of a wide age group range, twenty of which were subjected to the anesthetic effects of volatile absolute alcohol. Sequential patternings were observed to be of a clear order of appearance and disappearance in a fairly definite temporal sequence. The animals upon induction evinced behavioral tendencies of a caudo-cephalad nature while their recovery was cephalo-caudad. Any positivistic interpretation of these results would be too dogmatical. However, a probable explanation will be attempted. This theoretical explanation shall try to explain wherein the methodology and interpretations of previous studies have erred. [10 min.]

9:15 A.M. *The Effect of Partial Denervation of the Stomach upon Hunger in White Rats.* CLIFFORD T. MORGAN, Harvard University.

The present study seeks to determine whether the effect of insulin upon hunger strength, secured in an experiment previously reported, is related to gastric motility or to some other factor.

Fourteen albino rats were divided into two equal groups matched according to weight. One group was subjected to complete sub-diaphragmatic section of the vagus nerve and partial section of the gastric splanchnic nerves. Such an operation eliminates any effect of insulin upon gastric contractions. After recovery from the operation, these and the normal rats were run daily for one hour in a Skinner-type feeding apparatus. In all 14 animals, insulin was injected on one day, an equal volume of physiological salt solution on the next day, and so on in alternation. Zero, 15, and 30 minute intervals between injection and time of feeding were used in separate experiments. Later, the sucrose content of the diet was reduced from 20 per cent to zero and part of the study repeated. In all, over 600 curves were secured, tabulated, and treated statistically.

The results show that with a high sucrose diet, insulin injection reliably increases eating in vagotomized rats. On this same diet, normal rats reduce their eating with insulin injection. Normal rats give the same reaction as vagotomized individuals, however, when sucrose is eliminated from the diet.

The results are taken to indicate that an increase of eating with

insulin injection depends not upon any change in gastric motility but upon blood sugar level. They will be discussed in relation to the local theory of hunger.

This research was carried out at the University of Rochester in collaboration with J. D. Morgan. [15 min., slides.]

9:35 A.M. *Artificial Oestrus in the Guinea Pig Without Ovaries and Uterus.* GEORGE N. PAPANICOLAOU, Cornell University Medical College, and JOHN P. SEWARD, Connecticut College.

Previous investigators have induced receptivity in the spayed guinea pig by estrin-progesterone injections. Our problem is to determine whether these hormones act indirectly, through the remaining reproductive tissue, or directly on the central nervous system.

The method is as follows: A double ovariectomy and hysterectomy are performed. After recovery the animal is injected by Young's method and tested at intervals for the copulatory reflex.

To date, the experiment has been performed twice with one animal and once with a second. In all cases "heat" was successfully induced (see accompanying film). This indicates that the uterus is not essential to the reaction. The next step, now being attempted, is to remove the vagina as well, to see if oestrus can be induced in the absence of the entire reproductive tract. (Aided by the National Research Council Committee on Sex Problems.) [10 min., slides.]

9:50 A.M. *Temporal Relationships in the Copulatory Acts of Adult Male Rats During Three Hour Tests.* CALVIN P. STONE, Stanford University.

The gross descriptive features of a single copulatory act by male rats have been described by several investigators. No one, however, has made a systematic study of the temporal pattern of copulatory behavior leading to sexual non-aggression or satiation.

In male rats each ejaculation is preceded by a number of momentary intromissions (seldom less than 4 or 5). Following the ejaculation a pause that is variable as to duration from individual to individual but seldom less than 4 minutes long ensues. This pause gradually lengthens after the first ejaculation so that pauses of from 30 minutes to an hour or more may be expected during the third hour. Available data show that individual differences with respect to the temporal pattern of copulatory acts are more pronounced than those pertaining to the individual act and that both extrinsic and intrinsic factors contribute measurably to these individual differences. The measured effects of some of them will be exemplified. [15 min., slides.]

10:10 A.M. *The Effect of Sensory Stimulation on Heart Rate of Fetal, New-Born, and Adult Guinea-Pigs.* LEONARD CARMICHAEL, Tufts College.

In the present study, a suitable amplifying system and oscillograph have been used in the photographic recording of electrocardiograms of fetal, new-born, and adult guinea-pigs. In part of this study, an appa-

ratus has been used which employs thyatron tubes tripped by the heart impulse, so arranged with condensers that a graphic record is given of change in rate of individual beats. In fetal animals, prepared according to techniques previously described, maintaining placental circulation, a new type of collodion-sealed electrode was used. Sixty-six animals have been studied with the following results: There is a variability between different animals in each age group, both in frequency of beat and in constancy of beat rhythm. Fetal heart rate, under the conditions of our experiment, is relatively slow; that of the new-born animal, rapid. Adult heart rate is intermediate between the two. The total range of all animals is from 50 to 393 beats per minute. Photic stimulation has no constant effect. Sound stimuli are often followed by a slowing of rate within a period up to ten seconds. This effect is less constant in fetal than in air-breathing animals. The heart component of the "startle pattern" shows a general ontogenetic development. It is, however, too variable an indicator to use in the study of growth of receptor capacity in the visual or auditory fields in the fetal organism.

Tables and sample records will be shown. The writer wishes to express his gratitude to Mr. Bertram Wellman for his assistance. [15 min., slides.]

10:30 A.M. *Influence of Pressure and Other Factors on the Polarity Potential of the Human Eye.* WALTER R. MILES, Yale University.

A technique for recording the steady potential of the eye *in situ* and data on the reliability of this measurement have been recently published. The writer has also shown that this potential gives evidence of being influenced by fear or apprehension, as experienced in subjects who are not familiar with the measurement routine. The present report concerns preliminary experiments undertaken to explore the possibility of modifying the potential by means of eye-lid position, application of massage and of direct digital pressure, and from bathing the eyes in a hypertonic sodium chloride solution. A group of 18 young women who had served in previous eye-potential tests were used as subjects. In addition to confirming the earlier findings the present results indicate: (1) the potential as measured tends to be slightly higher when the eye is closed than when normally open; (2) the potential slowly decreases with repeated measurements in a relaxed posture and tends to come back up when the posture is changed; (3) more than half the subjects demonstrated a slight rise following 15 seconds of digital massage of one eye while the other (control) tended toward a lowered value; (4) direct digital pressure of moderate intensity raised the average value only slightly; (5) the introduction of 3 or 4 drops of 10% sodium chloride solution into the conjunctival sac of each eye produced a marked elevation (about 30%) and elevation lasted well beyond the time when any smarting or discomfort were reported present. In general the results indicate that the polarity potential of the eye as measured by leads from adjoining skin areas is relatively stable but possible of artificial modification. [15 min., slides.]

10:50 A.M. *The Relation of Pilomotor, Pupillary, Cardiac and Respiratory Responses.* C. M. HARSH, J. G. BEEBE-CENTER, and S. S. STEVENS, Harvard University.

The association of cardiac acceleration and pupillary dilation with voluntary pilomotor erection of hair has been interpreted by Lindsley and Sassaman as indicative of generalized sympathetic discharge. Earlier investigations of the visceral concomitants of 'voluntary' breathing changes suggested to us, however, that the cardiac and pupillary responses might be functionally correlated with breathing changes alone.

By recording (in various combinations) heart rate, breathing, pilo-erection, and pupillary dilation it was found that pupillary dilation and cardiac acceleration can be elicited by voluntary breathing changes. Furthermore, pilo-erection can be elicited without cardiac acceleration, and *vice versa*. It is concluded that Lindsley and Sassaman's data are not proof of a generalized sympathetic discharge and, further, that the pilomotor response can be elicited without generalized sympathetic activity. [10 min., slides.]

SOCIAL FACTORS IN PERSONALITY

Tuesday, September 5, 1:30 P.M.

Room 2, Education Building

JOHN F. DASHIELL, Chairman

1:30 P.M. *Differences in Clique Formation Among Adolescent Boys and Girls Revealed by a "Guess Who" Technique.* HELEN M. CAMPBELL, University of California.

Distinctive sex differences in friendship groupings are shown by analysis of responses to the item "Here is someone who is my best friend" appearing on a personality inventory of the "Guess Who" type, given to members of a ninth grade class, which included 75 girls and 77 boys, with an average age of 14.5 years. Classmates were allowed to mention each other for the various items as often as they wished. Association into cliques is descriptive of the girls, as contrasted with the boys whose social relationships are not rigidly structured.

That this difference is also reflected in the way in which judgments are made for the other items of the Guess Who Test is revealed by a number of significant comparisons. Boys mention a proportionately larger number of different individuals; girls mention the same individuals more often. Girls' mentions are made proportionately more often for best friends, or other members of their friendship groups, as contrasted with boys' mentions. There tends to be a uniformity by clique members in their mentions outside the clique, for girls. Proportionately more unfavorable mentions are made by girls than by boys, for those outside the clique.

Correlations, critical ratios, and sociograms are presented. [15 min., slides.]

- 1:50 P.M. *The "Kid-Friend" Relationship: Some Observations on the Dynamics of Social Interaction.* SAMUEL B. CUMMINGS, JR., Kenyon College.

This study describes a complex system of intimate personal relationships that has arisen in an institution for mentally defective males. Typically, the relationship consists of a pairing of an older boy, the "friend," and a youngster, the "kid," who embark upon a rather exclusive and monogamous personal association which involves mutual loyalty, obligations and benefits. While somewhat labile and subject to dissolution when either participant becomes dissatisfied with the other, the association is rationalized, moralized and defended by resistance and resentment against external interference with its operation. It is freely and easily contracted and is not essentially a dominant-submissive form of association. In the larger setting of the institution, the participants tend to derive an enhancement rather than a loss of status and prestige from other patients. The function of the relationship in fulfilling individual needs in a highly simplified, uniform and depersonalized environment is described. The similarities of the relationship to established forms of personal association are also suggested. [15 min.]

- 2:10 P.M. *Personality Differences Between Boys and Girls in Early Childhood.* BRUNO KLOFFER, Rorschach Institute, New York City.

Preliminary experimental studies with the Shady Hill Growth Study, Harvard University, and with the experimental nursery schools of Vassar and Sarah Lawrence Colleges have demonstrated the applicability of the Rorschach method to personality diagnosis in early childhood. Matching and ranking experiments have established the reliability and validity of Rorschach interpretation at this age level.

As a by-product of these preliminary experiments, indications were found of sex differences at this stage of personality development. Further systematic investigations with children around the three, five, and seven year age levels, have shown the following results: (1) The girls, as a group, show reaction to external emotional stimuli in their responses at an earlier age (color responses), (2) the girls begin earlier to adjust their reactions to emotional situations (form-color combinations).

Out of the available material, the results of investigation with one hundred representative cases have been selected for presentation. [10 min., slides.]

- 2:25 P.M. *The Relationship of Hobbies to Personality Characteristics of School Children.* PAUL L. BOYNTON, Peabody College.

The study involves approximately 3,200 sixth grade children in 159 different schools, at least four of which were located in each of twenty-five states, distributed through practically all geographic regions. The data are taken from *The Coordinated Studies in Education*, the advisory committee of which is composed of the writer as chairman, and Drs. Greene of Iowa, King of Pennsylvania, McElhannon of Baylor, Obenchain of the Birmingham Public Schools, Otto of the W. K. Kellogg

Foundation, Segel of the United States Office of Education, and Van Wagenen of Minnesota.

From a series of data, the items of sex, age, scholastic aptitude, hobbies, teacher evaluations of personality, and personality test scores were selected for a Hollerith analysis. Among various problems investigated the following facts appear significant:

1. Certain hobbies, more than others, are associated with significant frequency with certain types of personality test scores. Sex differences are present in certain instances.

2. Teachers are likely to associate certain types of personality traits with certain hobbies with some greater frequency than is the case with other hobbies. Some evidences of sex differences appear.

3. The absence of a hobby is likely to be associated with a different type of personality score and different type of teacher evaluation from that which is found when certain hobbies, at least, are present.

4. The rôle of tested intelligence is not clear-cut in relationships noted.

5. The present data lend support to the frequently advanced hypothesis that hobbies may have a definite mental hygienic value with children. [15 min.]

2:45 P.M. *Levels of Aspiration in Academically Successful and Unsuccessful Children.* PAULINE SNEDDEN SEARS, Yale University.

Thirty-six children having widely divergent past experience of school success or failure were studied individually by standard clinical and level of aspiration procedures in order to determine (1) the relation of long-continued academic success or failure to level of aspiration pattern for school subject matter tasks, and (2) personality correlates of the level of aspiration pattern.

The results indicate that past experience of success or failure is significantly related to both size and variability of discrepancy scores (level of aspiration score minus performance score) on experimental materials closely resembling those on which the experience of success or failure had previously occurred. Past experience of success is found to be associated with a low positive discrepancy score and with lesser variability of this measure, while past experience of failure is associated with a high positive discrepancy score and with greater variability. Brief experimentally induced success and failure are found to have, in general, the same effects on the discrepancy scores as the past experience of long-continued success and failure, although these differences are not highly significant statistically.

Patterning of level of aspiration response, in terms of three measures of the functioning of the level of aspiration other than discrepancy, is not found to occur differentially in groups varying in past experience of success or failure. When the subjects are reclassified on the basis of size and consistency of discrepancy scores, however, clear patterns of level of aspiration response appear. This classification also brings out certain similarities in characteristic forms of reaction, in addition to the level of aspiration, in the personality structures of subjects classified together. These similarities reveal the presence of clusters of associated personality

attributes, the characteristic level of aspiration response being itself one of these attributes. [15 min., slides.]

3:05 P.M. *The Relation of Certain Personality Variables to Level of Aspiration.* JOHN W. GARDNER, Connecticut College.

Earlier studies by Frank and by the present experimenter indicated that individual differences in aspiration-level in an experimental situation can be reliably measured and are sufficiently generalized to appear in dissimilar tasks. The present study attempts to test the assumption of previous investigators (Hoppe, Frank, Jucknat) that there is a direct relationship between aspiration-level behavior in an experimental situation and certain personality traits.

The subjects were 51 boys, high-school students, taken from a larger group which has been intensively studied in connection with the University Adolescent Study in Berkeley, California. Aspiration-level scores were obtained in connection with performance on a digit-symbol substitution test. False performance scores (identical for all subjects) were reported to the subject after each trial in the task, and he was then required to predict his performance on the ensuing trial. The aspiration-level score is based upon the extent to which his estimates of future performance deviate from his level of past performance. Ratings were obtained on eight personality variables, including all of those which Hoppe, Frank and Jucknat assumed to be directly related to aspiration-level behavior. The ratings were made by psychologists on the staff of the Institute of Child Welfare, all of them having had extended contact in a variety of situations with the subjects rated.

The correlations obtained between ratings and aspiration-level scores were for the most part insignificant. In a table of forty coefficients only two were four times as large as their probable error. It is concluded that there is no justification for assuming that a particular sort of aspiration-level behavior may be taken as unequivocal evidence concerning the presence or strength of any one of the traits dealt with. [15 min., slides.]

3:25 P.M. *A Study of Parental Dominance and Submission.* PERCIVAL M. SYMONDS, Teachers College, Columbia University.

Twenty-eight pairs representing respectively children who are much dominated by one or both parents and children whose parents are very submissive toward them were studied. The children in each pair are of the same sex, and roughly equated for age, school progress, intelligence, and socio-economic status. Children who are dominated by their parents have the better socialized behavior. They are polite, honest, careful, and dependable, but also, are sensitive, self-conscious, submissive, shy, and docile. Children of submissive parents are disobedient and irresponsible. They defy authority, and are unmanageable, but they are independent and self-confident. Each extreme, therefore, has positive and negative characteristics.

In their inner life the dominated children feel inferior and inadequate, are confused, bewildered, and inhibited. The children of submissive parents, on the other hand, feel self-important and over-confident, are given to boasting, and are considerably less inhibited.

In the case of the dominant parents it was found that usually one parent is in ascendance, dominating the whole family situation with a character which is compulsively neurotic. In the case of submissive parents there is frequently inadequate personality accompanied by childishness and failure to accept responsibility.

Dominant parents had dominant parents and submissive parents had submissive parents. An interesting reversal is seen here, for children of dominant parents tend to be submissive as children, but later, as parents, become dominant over their own children. [15 min.]

3:45 P.M. *Prestige and Psychometrics in a Primitive Society*. CECIL WILLIAM MANN, Claremont Colleges, Claremont, California.

Among the principal elements in the Fijian social and economic order are the acceptance of chieftainship, communalism and ceremonial. All three afford opportunities for the development and maintenance of prestige. Chieflikeness is inherited, rank depending upon the degree of chieflikeness of both father and mother. Rank carries with it the privilege of social superiority and power, and the responsibility of maintaining prestige. From chiefs of dependent tribes, personal and communal tribute may be exacted in the form of native labor and produce. A proportion of the latter will be perishable and will be redistributed in the form of a feast. The amount of tribute that can be demanded and the size of the feast will be measures of the prestige of a chief. The communal system is rooted in the borrowing of labor and goods. Only the most exceptional circumstances could impel a Fijian to reject a communal request. The number of persons who may borrow from him and from whom he may borrow will be criteria of the prestige of the Fijian. Ceremonial presentations are frequently made and enhance the prestige of the chiefs and the commoners. The chiefs gain prestige by the individual presentations which are made, while the strict order of drinking precedence preserves the prestige of the individuals. Some tribes have acquired prestige through the development of special abilities, *e.g.* the carpenter tribe and the firewalkers.

Administering a testing programme in Fiji, the writer had opportunities for noticing the effect of the above mentioned elements on testing. In some cases, the natives were greatly surprised to find that they were not allowed to assist each other in the group test. Many of them consequently lost interest. Other instances are cited to indicate the importance of controlling cultural variables when the results are to form the bases of race comparisons. [15 min.]

4:05 P.M. *Adulthood of the Favored Child among the Northern Blackfeet*. L. M. HANKS, JR., University of Illinois.

Among the competitive patterns of the north plains Indians, giving took a prominent place. A man increased his prestige through giving for large gifts still larger gifts in return. When gifts were made in the name of a child, most frequently a son, the man and particularly the child received special status which for the child was called the favored child or *minipuka*.

The status of *minipuka* was acquired gradually through abundant giv-

ing. Ordinarily should any one make a small gift to a child, an equivalent return gift would be made. The *minipuka* gave in return gifts many times the value of the original gift. As a result a *minipuka* was accorded special treatment: He was sheltered from sordidness, not expected to work, provided with supernatural aid through many sacred objects, was entered into many societies, and at social gatherings was given the seat of honor and choicest food. After the death of the parent or upon reaching maturity, the *minipuka* was expected to continue an ostentatious pattern through his own initiative and industriousness.

This shift from a semi-parasitical role to a role of providing and giving was accompanied by many difficulties. The individual had to assume adult responsibilities, for which he was ill-prepared. Frequently there is found a period of ostentatious giving followed by bankruptcy. A second pattern is miserliness which is equally reprehensible. In work many continue in slothful habits, thus losing prestige. In social groups some become shy and retiring while others are cranky and irascible. Case studies are offered to substantiate these patterns. [15 min.]

HUMAN LEARNING, I

Tuesday, September 5, 1:30 P.M.

Auditorium, Education Building

EDWIN R. GUTHRIE, Chairman

1:30 P.M. *Retention and Transfer in Different Types of Training.*
GEORGE KATONA, New School for Social Research, New York.

The curve of forgetting has been frequently studied with different types of material, but comparatively seldom with different types of learning methods, such as mechanical memorization, learning by understanding, and intermediate methods. The author in using such methods in acquiring knowledge of the same material, *e.g.* how to solve a difficult problem, obtained extensive differences in the rate of forgetting and the transfer effect.

Experiments were devised in which not only the learning method but also the form of the tests was varied. Two comparable groups which both learned to understand the essential points of a principle were tested in weekly intervals. To Group I the same problems were presented each week. A practice curve was obtained with regard to the specific problems which were tested often. But the performance became stereotyped and solving variations of the problem caused great difficulties. The final performance was similar to that of another group which had learned by memorizing specific solutions.

Group II was tested in weekly intervals with different problems (representing variations of a principle). A curve differing from the usual curve of forgetting was obtained. After an initial loss the performance improved slowly but steadily. The final accomplishment, measured by the ability to solve variations of the problem which were not taught or

tested before, was the highest with Group II, then followed the control group (which was not tested at all in the interval), and was lowest with Group I.

The presentation of different examples, in the training or the testing period, may influence the performance favorably. That applies to a learning process which can be characterized as understanding of whole-qualities developed by improving the organization of the material. [15 min., slides.]

1:50 P.M. *A Spontaneous Recovery Curve for the Galvanic Skin Response in Human Subjects—A Discrepancy Between Results Obtained in Theoretically Parallel G. S. R. (Human) and Bar-pressing (Rat) Experiments.* DOUGLAS G. ELLSON, Stanford University.

The purpose of the experiment was to plot a curve of spontaneous recovery as a function of the recovery interval with human subjects, using the galvanic skin response. The training or conditioning procedure for four groups of 20 subjects was the conventional paired presentation of tone-shock combinations to establish a conditioned G. S. R. The response was then extinguished to a criterion (one-third of its original amplitude). The subjects were then given a rest interval of 5, 20, 60, or 180 minutes, a different interval for each group. Following the interval, the spontaneous recovery of the response was measured by a second extinction. Two measures of "strength of the response tendency" were used: (1) mean amplitude of the first two responses, and (2) number of responses required for extinction. The first measure presented a negatively accelerated curve of recovery similar to that found in a previous rat experiment with the bar-pressing response. The second measure showed no evidence of a progressive recovery—in fact there was an unreliable trend in the opposite direction.

An hypothesis is suggested to explain these results on the basis of two factors: (1) expectation of shock (affected by verbal evaluation of the situation), and (2) negative adaptation of the capacity to respond. [15 min., slides.]

2:10 P.M. *The Temporal Factor in Retroactive Inhibition.* EDWIN B. NEWMAN, Swarthmore College.

The more important studies of retroactive inhibition during recent years have laid major emphasis upon the factor of similarity and the concept of negative transfer. There are, however, several studies, notably those on reminiscence, which have appeared quite recently, indicating that the temporal factor in retroactive inhibition cannot be neglected. It seemed worth while, therefore, to repeat with much greater variety of temporal conditions the experiments of Robinson and McGeoch which yielded negative results. The procedure involved measuring retroactive inhibition with conventional memory materials, varying the total time between 24 hours and 14 days and the position of interpolation throughout the entire interval. At the present time it is possible to report certain preliminary results.

1. The finding of I. Miller that there is a sharp rise in inhibition as the material is brought into very close proximity with the reproduction has been completely confirmed.

2. The susceptibility of material to interference, measured either as an immediate effect or as an effect persisting over a period of time, decreases with increasing age of the original material.

Whatever may be the form of the final results demonstrating these conclusions, there can be no doubt that important and systematic changes do take place as a function of time. It is doubtful, however, that time itself should be considered the controlling variable. [15 min., slides.]

2:30 P.M. *Retroactive Inhibition Tested Immediately.* W. B. PILLSBURY, University of Michigan.

A study of so-called retroactive inhibition has dealt mostly with learning of series and with tests made at least a day after learning. This investigation was of the effect of work done immediately after learning upon memory span. The observers were shown eight geometrical forms or words, tachistoscopically, then ten seconds later were asked to write what they had seen. In the experimental series they were asked to spend the interval solving arithmetical problems or writing answers to questions. In the comparison series they did nothing. The results showed that both forms of distraction were effective in reducing the amount seen on the average of from twenty to more than fifty per cent. One subject, for example, reported an average of 4.6 seen with distraction and 3.7 without. Others showed larger differences. The differences are, in the main, statistically reliable.

When six nonsense syllables were offered serially with a memory apparatus, a similar reduction in the amount recalled after ten seconds with distraction as compared with ten seconds without distraction was found. The results indicate that part of the effect in retroaction may be due to mere interference with the setting of the material as well as to associative inhibition.

The writer is indebted to Ann Sylvester for assistance in the conduct of the experiment. [15 min.]

2:50 P.M. *The Specificity of Retroactive and Proactive Inhibition in Serial Verbal Habits.* ARTHUR W. MELTON, University of Missouri.

The purpose of this study, made in collaboration with Rebecca S. Walborn, was to determine the extent to which inter-serial inhibition is specific to the similar items in the two series. Two sets of 3-consonant "syllables" were used. The syllables in one set (X) were made from one group of 9 consonants and the syllables in the second set (Y) were made from a different group of 9 consonants. In the usual retroactive inhibition experiment, the original list was made by alternating the syllables from the X and Y groups, and the interpolated list was composed entirely of X syllables or entirely of Y syllables. In this way it was possible to determine the extent to which the interpolated learning interfered with the recall and relearning of the similar and dissimilar items in the original list. The experiment was repeated with the original

and interpolated lists reversed, in order to determine in the same way the specificity of proactive inhibition in the learning and in the recall and relearning of the second list. Forty-eight S's were used, and the factors of practice, serial position of similar and dissimilar items, and difficulty of specific lists were equalized for the various conditions.

Results: The earlier finding that retroactive inhibition is significantly greater than proactive inhibition, when measured by recall and relearning scores, was confirmed. Furthermore, both proactive inhibition and retroactive inhibition were found to be significantly greater in the recall and relearning of the similar items in the two lists than in the recall and relearning of the dissimilar items. There was, however, some inhibition of the dissimilar items. Specific inhibition was also found during the learning of the second list. Implications for theories of retroactive inhibition will be considered. [15 min., slides.]

3:10 P.M. *Remote Associations as a Function of Interpolated Learning.*
JOHN A. McGEACH, State University of Iowa.

During the learning of serial lists associations are formed not only between adjacent items in a forward direction, but also between certain items and others removed from them by one or more skipped terms in either the backward or the forward direction. These remote associations represent an organization of the list whereby it is knit into a much greater unity than the usual method of serial testing would imply.

The present experiment has studied the influence of interpolated learning upon these remote associations, when they are elicited by a modified free association technique. After practice with the method, seventy college men went through two rest and two work conditions in a counterbalanced order. The learning materials were lists of 10 adjectives, and the interpolated lists were synonyms of those in the original list. The test for remote association began ten minutes after the completion of five learning repetitions. Associative latency was measured by a microphone-voice-key-graphic-recorder setup.

A large number of remote associations were formed, and the interpolated learning produced a substantial decrement among them. This decrement was not as large as the decrement among the immediately adjacent associations. It was equal for remote backward and remote forward associations. These results contradict the expectations from results on total lists that the greatest decrement should be among the supposedly weaker associations.

The influence of interpolated learning is, thus, to disrupt the indirectly established organization of the list, as well as the direct serial associations, and to disrupt them in a manner which is independent of the supposed strength of the remote associations. [15 min., slides.]

3:30 P.M. *Memory for Physically Identical Elements in Human Maze Learning: A Transfer Problem.* WILLIS D. ELLIS, University of Arizona.

Transfer of training from one learning situation to another is commonly assumed to rest upon some factor of resemblance, similarity or, indeed, identity between the earlier task and a later one. However, Kurt

Gottschaldt's study of past experience has revealed that a familiar figure appearing in a new setting will sometimes not be seen at all (principle of camouflage) and that past experience is therefore under such circumstances of little or no importance. Similarly, Joseph Ternus has shown in cases of perceived movement that physical identity between two forms will or will not be experienced as *phenomenal* identity depending on structural features of the forms themselves, conditions of observation (distance, brightness), and so on. As regards problems of transfer in learning, a similar reinterpretation may be necessary, for it is perhaps doubtful if physical identity necessarily assures phenomenal identity.

As a device for investigating this, three finger mazes were used with 30 college students acting as subjects. Ten subjects learned Maze I with the right hand; 10 learned Maze II with the left hand. Maze III was a "dual" maze composed of Mazes I and II together on a single board, and this also was learned by 10 subjects. The preceding 20 subjects were then given Maze III to "relearn" although 10 of them already knew one-half of it and 10 the other half. Since there was physical identity between each of the preceding mazes and one-half of Maze III, a considerable transfer effect might have been expected. Actually the subjects who already "knew" half of Maze III had almost exactly as much difficulty in *learning* it as did the 10 control subjects who learned this maze without previous training. The experimental work reported in this paper was done in collaboration with Leslie Collie, graduate student in psychology at the University of Arizona. [15 min., slides.]

3:50 P.M. *The Influence of Goal-Distance and Route-Security upon the Velocity of Directed Action.* HERBERT F. WRIGHT, Carleton College.

The purpose of the study was to measure the psychological forces governing a course of directed action in relation to changes in *goal-distance* (length of *path* between individual and goal) and *route-security* ("safety" of path). The velocity of directed action was used as a criterion for the strength of a resultant of forces. Children were used as subjects.

The central feature of the experimental situation was a long "table." At one end of the table a lever was mounted. By operating the lever it was possible for the child to procure a marble which had been placed at the opposite end of the table. Three *path-structures* were provided: (A) secure (*i.e.* "broad and safe" throughout); (B) secure-insecure (*i.e.* broad and safe except for the middlemost one-third which was "narrow and hazardous"); (C) insecure (*i.e.* narrow and hazardous throughout). Each child participated in a series of at least ten trials involving one or, successively, two of the three path-structures. The velocity with which the child actuated the lever was recorded automatically in relation to the position of the marble on the table.

The results include the following. (1) All three paths: (a) an increase in velocity from trial to trial; (b) a marked retardation in the terminal sector. (2) The secure path: a virtually constant velocity except for the first trial on which there occurred a "slow start." (3)

The insecure path: an increase in velocity on all trials with approach to the goal. (4) The secure-insecure path: (a) a retardation in the "zone of insecurity"; (b) a relatively low velocity in the "zone of approach to the zone of insecurity." An attempt will be made to exemplify by a single analysis the field-theoretical treatment which has been made of these results. The research reported was conducted at the State University of Iowa. [15 min., slides.]

PERSONNEL

Tuesday, September 5, 1:30 P.M.

Room 521, Hydraulic Laboratory

HAROLD R. CROSLAND, Chairman

1:30 P.M. *An Application of the Life History Method.* MARY C. VAN TUYL, University of Michigan.

Description of a technique developed from the study of nearly 1,000 autobiographies of college students, collected during a period of 8 years. These autobiographies were guided by outlines given to the students and therefore they contained comparable material on background and on present thinking.

In order to handle this complex material a code list was constructed of 150 items containing from 2 to 66 classes under these items. This code formed a framework into which a large number of details from each autobiography was placed and transcribed to Hollerith cards. The key item of the study was the one in which these students were distributed into classes according to their present religious mode of thinking, ranging from extreme orthodoxy to four classes of modern liberals. Relation of position in this classification to a number of other items will be discussed. [10 min., slides.]

1:45 P.M. *Predictive Value of College Admissions Data.* MARGARET MERCER, New York State College of Home Economics, Cornell University.

This study is preliminary to a more complete inquiry into factors predicting success in the N. Y. State College of Home Economics. The investigation is made to help solve problems arising from the need to evaluate credentials of six times as many girls as may be accepted.

Data studied consist of regents' grades, principals' personality ratings, high school activities, and rating on a personal interview. Subjects were: members of the three upper classes who for any reason had left college without receiving a degree; equal numbers of students who stood highest and lowest respectively in the same classes.

Consistent differences are shown in high school grades and principals' ratings in favor of the group now ranking highest in college, but not in high school activities or in ratings on personal interview. The findings are supplemented by case studies indicating influence of personal adjustment factors. [10 min.]

2:00 P.M. *Corrective Reading in College.* BERT A. NASH, University of Kansas.

A semester experiment in the improvement of the reading ability of 121 college students, through the coöperation of graduate students enrolled in a course in Reading and Study Laboratory. A modified tutorial system was employed, supplemented by the use of various instruments now used experimentally in many clinics. The data include analyses of the types of reading difficulties of college students, their opinions of their difficulties, and a description of the individual corrective measures used.

The results of the experiment indicate that 86% of the students made significant improvement in all aspects of the reading process, as measured by batteries of standardized tests and photographs of eye movements. Data will be presented also to show the permanence of this improvement after an interval of one year. The group data will be supplemented by case studies involving particular reading difficulties and remedial measures. [10 min.]

2:15 P.M. *Significance of the Point of Reference.* EDWARD K. STRONG, JR., Stanford University.

The interests of physicians correlate .16 or .83 with the interests of lawyers: similarly the interests of physicians correlate —.51 or .49 with the interests of life insurance men. (In both cases the test blanks of identically the same samplings are used.) Almost any other correlation may be obtained using these test blanks.

When professional men are contrasted with one another it appears that the interests of physicians differ greatly from lawyers (.16). But when all occupations are considered the interests of physicians and lawyers appear to be nearly alike (r of .83).

The relationship between the interests of any two occupations is relative, not absolute. That relationship depends among other things upon the point of reference. When the point of reference is centered among the occupations to be considered large plus and minus correlations result: when the point of reference is outside the group of occupations, only plus correlations result: the farther removed is the point of reference the higher must these plus correlations be. [15 min.]

2:35 P.M. *Primary Ability Tests Applied to Engineering Freshmen.* ROBERT G. BERNREUTER, Pennsylvania State College.

Thurstone's Primary Ability Tests, Experimental Edition, were administered to 170 engineering freshmen at The Pennsylvania State College. The reliabilities of the sub tests ranged from .75 to .96 with a median of .93. The primary ability intercorrelations ranged from .03 to .45 with a median of .24.

Engineering students were found to be significantly different from the high school seniors reported by Thurstone in that they scored higher in the spacial and reasoning factors and scored lower in the verbal and and induction factors.

The primary abilities were also correlated with scholastic success in

mathematics, English, drawing, chemistry, and psychology courses. On the basis of the results, it seems reasonable to expect to find significant relationships between the primary abilities and success in other specific courses and curricula.

The study was conducted with the coöperation of Mr. Charles H. Goodman. [10 min.]

2:50 P.M. *A Study of Employees' Attitudes.* HAROLD B. BERGEN and JOEL DEAN, McKinsey, Wellington & Company, New York.

This study was made to determine the relative morale of groups of industrial and office workers and their attitudes towards specific personnel practices. More than 1,000 employees of one company checked the items with which they agreed in a questionnaire consisting of attitude scale statements and multiple-choice questions.

The average morale scores varied from 6.94 in the highest department to 4.59 in the lowest, with an average score of 5.71 for all employees. The score of female employees with over 7 years' service, employed in the general offices of the company, was especially low in comparison with that of women with shorter service. Male employees with from 2 to 7 years' service had a lower score than those with greater or less service. Differences in supervision and attitudes towards the fairness of pay differentials were found to be the most important determinants of morale. [10 min.]

HUMAN LEARNING, II

Wednesday, September 6, 9:00 A.M.

Room 2, Education Building

WALTER B. PILLSBURY, Chairman

9:00 A.M. *Predicting a Learning Ability After Varying Intervals.* HAROLD D. CARTER, Institute of Child Welfare, University of California.

A paired associates learning test was administered repeatedly to about fifty boys and fifty girls, at six-month intervals for four years beginning at age twelve. The task was to recall words in response to pictures. The words and pictures were completely different at each successive testing.

The reliability coefficients obtained from odd and even halves averaged .86. Inter-correlations between successive tests declined from an average of .64 for a six-month interval to .41 for a three-year interval. The correlations increased again for intervals of 3.5 and 4 years.

Studies in which intelligence tests have been repeatedly administered have shown higher re-test correlations for short intervals, and lower ones for long intervals. The comparative content of the tasks suggests one explanation. Consideration of relationships with periods of rapid growth suggests further explanations. [10 min., slides.]

9:15 A.M. *Negative vs. Positive Practice in Correcting Spelling Errors.*
HELEN PEAK, Randolph-Macon Woman's College.

Forty-eight college students were scored on their spelling of a list of 120 words chosen from a standardized spelling scale. One week later a second test was given. The subjects were then divided into two groups equated for scores on American Council Psychological tests, college class, average difficulty and number of words missed on the tests. The positive group wrote correctly five of their misspelled words 32 times, five, 16 times. The negative group wrote five words as misspelled 32 times, five, 16 times, with instructions to remember that the spelling was incorrect. The difficulty of the words practised was also equated for the groups. Three days later both original forms of the test were given. Three weeks later, both tests were given again. Only small differences appeared between the groups with slightly fewer spelling errors for the positive group. [10 min., slides.]

9:30 A.M. *A Study of the Developmental Aspects of Child Thought by a Clinical Method.* BYRON C. SARVIS, University of Kansas.

Two hundred seventy-four children ranging in age from two to seventeen years were studied by a clinical method to inquire into the nature of the development of concepts of physical causality and moral judgment in the same child. Concepts of physical causality were obtained from reactions to a series of simple demonstrations of buoyance. Concepts of moral judgment were elicited by participation in and explanation of social games. Piaget's seventeen types of thinking served as a point of departure for classification and interpretation of the data. The relation between the development of these two aspects of thinking and chronological age, mental age, and environment was also studied. The results show that there are not clearly differentiated qualitative levels characteristic of certain ages, although there are stages at which certain quantitative differences are found. [10 min.]

9:45 A.M. *Concept Formation in Children.* LOUIS LONG, Columbia Medical Center.

The aim of this investigation is to discover how and when a child recognized that certain characteristics of objects of the genus group are similar to those possessed by familiar species; to discover by what process the delimitation of the species name takes place; and to study the course of development of further hierarchies, their flexibility and their range.

This paper will be limited to a discussion of the concept of roundness in a group of fifteen children ranging in age from two to six years. A non-verbal discrimination technique has been developed which permits a careful control of stimuli and experimental conditions.

The stimuli were divided into three types: spherical objects, cylindrical objects, and two dimensional figures.

Twelve subjects established a concept of spherical roundness. In ten of these subjects the concept was broad enough to include cylindrical objects as well as spherical objects; and, similarly, the concept of spherical-circular roundness included two dimensional roundness and the

rounder figure of a pair of non-round two dimensional figures. The spread of the concept of spherical roundness to the other types of stimuli was, however, not equal. The transfer was greatest from spherical to circular and least from spherical to the rounder of two dimensional figures.

An attempt has been made to isolate in the field of human development some of those factors determining range of equivalent stimuli which have been pointed out by Lashley and Klüver in their work with animals. [15 min., slides.]

10:05 A.M. *The Effect of Nursery School Attendance upon the I.Q.*
JAMES D. PAGE, University of Rochester.

Seventy-five children who had attended nursery schools for a period of from one to three academic years were given the L form of the Stanford-Binet and their intelligence test scores were compared with similar test scores earned by their siblings who had not attended nursery schools. The interval between nursery school attendance and test administration ranged from a few months to four years. At the time of testing the median age of the nursery school group was 7 and that of the sibling control was 10.

Our data indicate that nursery school attendance does not increase subsequent intelligence test performance. The I.Q. of children who had attended nursery schools did not differ significantly from those of their brothers and sisters who had not attended nursery schools. [10 min., slides.]

AESTHETICS

Wednesday, September 6, 9:00 A.M.

Room 521, Hydraulic Laboratory

MADISON BENTLEY, Chairman

9:00 A.M. *The Validity of Four Accepted Criteria of Design.* LLEWELLYN N. WILEY, University of Illinois.

Can a relatively unselected group of persons agree upon the pleasingness of a set of abstract designs? Will a group of artists agree as to which designs have the most symmetry, balance, rhythm, and unity, when the estimations of these qualities depend upon the artists' individual definitions? Will designs having the greatest amounts of symmetry, balance, rhythm, and unity be the most pleasing to the unselected group?

Fifty black-white, relatively abstract line drawings were rendered in uniform lantern slides and presented twice to 144 students of psychology 1, and 4 times to 5 members of the Fine Arts School faculty of the University of Illinois. Ratings on each of the designs in terms of "pleasantness" were obtained from the students, while ratings on symmetry, balance, rhythm, and unity were had from the specialists. If each design be given a score made up of the ratings it received from 72 of the 144 raters, the correlations between the 50 pairs of summed

ratings prove to be .98 (first presentation) and .97 (second). The comparable group retest reliability is .94. Individual retest consistency was found for 138 subjects to have a median of .50. Ratings for "pleasantness" are therefore sufficiently reliable to demonstrate agreement among individuals. Estimation of symmetry, balance, rhythm, and unity have the following self-correlations, respectively: .90; .83; .87; .78 (three raters against two raters stepped up to a population 1.5 times that size). A correlation of nearly .90 between symmetry and balance suggests that the two must exist concurrently. The other measures are all positively correlated to a less extent. The correlation between the sums of the "pleasantness" ratings and the 4 criteria is .56 (first test) and .65 (retest). [15 min., slides.]

9:20 A.M. *The Effects of Protracted Observation of a Painting.*
GILBERT BRIGHOUSE, Occidental College.

Fourteen paintings were closely examined by twenty-one observers for a total of ninety-six minutes each painting. Each observation period was four minutes for each painting, repeated four times weekly for six weeks. Each observer made rank-order comparisons of the paintings, and rated their hedonic tones on a seven-point scale, both before and after the experiment. It was found that paintings by the moderns (Modigliani, Cezanne and Van Gogh) gained considerably in hedonic tone, that the classic and romantic paintings gained slightly, and that losses were recorded for the extreme abstractionists (Duchamp and Picasso). The results have significance for a genetic theory of aesthetic experience. [10 min., slides.]

9:35 A.M. *The Effect of Register and Tonality upon Musical Mood.*
MELVIN G. RIGG, Oklahoma A. and M. College.

Five musical phrases were played, each in five different transpositions, to eighty-four observers, who judged the emotional significance by means of a check list. In all, 2,100 judgments were made.

Transposing a phrase up an octave always made it happier, while transposing it down an octave had the opposite effect. For changes of approximately half an octave (transposition to the key of the dominant) the same rule held in eight cases out of ten.

By transposing the phrases up one-half step or down one full step, large changes were produced in tonality or key, although the changes in register were slight. No evidence was found in support of a view widely held among musicians that each tonality possesses a distinctive character. [10 min.]

9:50 A.M. *The Adlerian Principle in the Arts.* PAUL R. FARNSWORTH, Stanford University.

Two experimental attacks have been made on the problem of over-compensation in the arts. In one, children from the third through the sixth grade were rated by their teachers for art ability and were tested for color weakness. A slight positive correlation was found between excellence in color vision and art ability. The Adlerian hypothesis was not favored by these data. In a second experiment, auditory acuity scores

of unmusical school children of the lowest four grades were contrasted with scores made by the most musical. The majority of critical ratios, while insignificant in size, favored the Adlerian contention.

In a continuation of this latter study, college students have been tested for auditory acuity, have taken the six Seashore music tests, and have rated their musical status on a five point scale. The resulting data do not favor the Adlerian theory. [10 min.]

10:05 A.M. *The Dynamic Quality of Perception.* HERBERT S. LANGFELD, Princeton University.

According to the motor theory perception is related to the muscular response of the observer. If this theory is true, then there is in all "external" perception a projection of response into the object. This statement would seem to be identical with the usual definition of empathy, and empathy would thus be an almost universal phenomenon. When concepts cover too large a range of facts, they are apt to lose their usefulness. It seems, therefore, more profitable to limit empathy to that projection of response which gives a dynamic quality to the objects of perception. The relation of empathy to aesthetic experience and its place in a psychological theory of beauty will also be discussed. [10 min.]

10:20 A.M. *Perceptual Characteristics of Schematized Human Figures.* EGON BRUNSWIK, University of California.

Twelve variations of a graphic, crudely schematized human figure, about half of them involving changes of facial appearance besides those of stature, were presented to 58 students, using the method of paired comparison. Among the six apparent characteristics tested, greatest agreement among the subjects was found for "good-lookingness," followed in declining order by "age," "energy," "likeability," "happiness," "intelligence." In approximately the same order there is an increase in the relative influence of the face, although even for the last two of these qualities, apparent happiness and apparent intelligence, significant differences can be found for pairs differing only in stature and not in facial proportion. Besides the general tendency to perceive as more intelligent the standard medium figure, men seem to rate athletic more intelligent than leptosomatic figures with little emphasis on height, women tall more intelligent than short figures with little emphasis on breadth. For such qualities as happy, good-looking, and energetic, however, women seem to be favorably impressed also by breadth. An example of the tendency toward ambivalent effects is shown by the addition of spectacles to the standard face which increases apparent intelligence and decreases good-lookingness of the figure. [15 min., slides.]

SOCIAL PSYCHOLOGY

Wednesday, September 6, 9:00 A.M.

Auditorium, Education Building

GOODWIN WATSON, Chairman

9:00 A.M. *An Experiment in Social Behavior.* L. J. O'ROURKE, United States Civil Service Commission.

An extensive research study involving some eighty thousand pupils was carried out in public schools.

Certain challenging questions arose: Can children assume the leadership in improving their social behavior? Can children set up essential criteria for their own social behavior? Can such criteria be evolved out of their own experiences? How can we motivate children to make continuing efforts to improve their own social behavior?

One approach used is based on the desire for approval by one's associates. We applied the psychological principle that a person has a special interest in something he has helped to create. Standards deduced from one's own experiences are more meaningful and more likely to be followed.

Children worked in committees to make lists of likes and dislikes illustrated by stories of their own experiences. The essentially desirable qualities of honesty, truthfulness, coöperativeness, responsibility, kindness, good sportsmanship, unselfishness, self-control, are all included in the children's lists, but are expressed in terms of specific actions drawn from actual experiences.

Pupils' stories, thousands of which were submitted, are evidence that pupils can evolve desirable standards out of their own experiences. Teachers' reports furnish evidence of positive effect the program had upon pupils participating.

Another especially effective approach, used at a higher level, is, briefly: When the pupil is tempted to do or say something unkind, he asks himself, "Would I do or say this if someone offered me a dollar to do it?" If his answer is "No," he says, "Why, then, should I do it for nothing?"

Effectiveness of this approach is evidenced by the stories of experiences in applying it. Such stories evidence the feeling of satisfaction that comes with achievement. We give the pupil the tool, but he applies it himself. [15 min.]

9:20 A.M. *The J-curve Hypothesis and Behavior in a Small Community.* R. H. WATERS, University of Arkansas.

Allport has suggested that the J-curve will fit behavioral data only when the social conforming agencies have a relatively high potency. This suggestion has been tested and found valid in two investigations in a small community. One study showed that, in this particular community, motorists' behavior toward a traffic regulation does not yield a J-curve. In the second study the time of arrival at work by employees in an industrial concern did conform to the J-curve. It is thus suggested

that the J-curve, or the nature of the distribution of social behavior, may be taken as a measure of the strength of the social conforming agencies present. [10 min., slides.]

9:35 A.M. *Conforming Behavior and the J-curve Hypothesis.* FRANKLIN FEARING, University of California at Los Angeles.

The J-curve hypothesis of conforming behavior as presented by Allport and confirmed by Frederickson, Frank and Freeman is the subject of the present study. 1,541 observations were made on the behavior of motorists in a traffic situation in which conformity was primarily induced by stop signs, rather than by personal risk involved in non-conformity. Positions on a telic continuum were defined as follows: Stopped at line on pavement, stopped past line, slowed to 1 to 3 m.p.h., slowed to 3 to 6 m.p.h., slowed to 6 plus m.p.h., no change in speed. The data were analyzed in light of the following variables: (1) sex of driver, (2) size of vehicle, (3) number of passengers, (4) time of day, (5) day of week.

The results, when plotted, do not appear to confirm the J-curve hypothesis of Allport, but rather approximate a normal distribution curve.

It is suggested that the discrepancy between these results and those of other investigators is due to (1) the exclusion from our study of those cases in which the incentive to conformity included the possibility of a collision, (2) the use of chronometric methods in defining the positions on the telic continuum.

The use of "conformity" and "non-conformity" as descriptive categories in psychological analysis is discussed with particular reference to the distinction between objective or legal conformity and conformity in terms of the degree to which a given act satisfies the requirements of a specific social situation.

The relationship of conformity in the latter sense to various types of social situations is discussed.

Mr. E. M. Krise collected the data and assisted in the preparation of this paper. [15 min., slides.]

9:55 A.M. *The Construction and Use of a Telic Scale for Measuring War-producing Behaviors of Citizens.* FLOYD H. ALLPORT, Syracuse University.

The problem of international disputes may be restated as a societal event system, or field of human behaviors, from which war events emerge. This study deals with the significance of the acts of ordinary citizens within a country in an event system of this character. The principle of the telic continuum is employed, and psychophysical scales are constructed on the three variables of interest, effort and effect. Five types of international crises were employed as hypothetical situations for evoking the self-admitted responses to be measured. The scales are checked twice, once for individuals' own "performance," and once for their belief in what is right for citizens to do (*i.e.* their "consent"). The correlations between all these variables are high. "Consent" permits behavior a little more in the direction of war than does "performance." Scores on interest and effort run higher than those on effect. The stimulus situations used gave low mean scores and a narrow range,

indicating the relatively slight role of ordinary citizens in war production. There were, however, reliable differences between the appeals. Their strengths for evoking war-producing behaviors fall in the following order: threat to political autonomy, threat to our war strength and armaments, threat to our own territory, threat to foreign possessions. Threat to national honor and rights abroad has an indeterminate position. The significance for these findings for official action and for understanding war-production is discussed. There is acknowledged the extensive work on scale construction and the statistical treatment done by Gertrude A. Hanchett. [15 min., slides.]

10:15 A.M. *A Field Study of Psychological Aspects of Acculturation.*
IRVIN L. CHILD, Yale University.

This study presents an analysis of psychological aspects of membership in an acculturating group, based on a field study of second-generation Italian men in a New England city. The method of study was for the investigator to establish personal contact with second-generation Italians and obtain data by the use of four procedures: participant observation, life-history interviews with three persons, informal interviews, and standardized interviews with fifty informants.

Differences between Italian and American culture, institutions effective in producing cultural stability or change, and the status of Italians in the community are identifiable features of a social setting which poses psychological problems of adjustment for the second-generation individual. These problems may be reduced, in large part, to a conflict between acting so as to make himself acceptable to the Italian group and acting so as to make himself acceptable to the American group. The diverse modes of solution of this conflict are classified into three general types of reaction. In the "apathetic" reaction, the individual partially escapes from the conflict by a reduction of the instigation to pursue either of the conflicting sequences of behavior, and he does not become consistently affiliated with either nationality group. In the "in-group" reaction, the instigation to become accepted by Italians gains dominance, and the individual accepts membership in the Italian group. In the "rebel" reaction, the instigation to become accepted by Americans gains dominance, and the individual rebels against his membership in the Italian group and tries to be known as an American. The three types of reaction are described and interpreted as they are shown in individuals' relationships to their personal associates, to the nationality groups, and to culture traits. [15 min.]

10:35 A.M. *The Clubhouse Project in the California Adolescent Study.*
W. J. CAMERON, Institute of Child Welfare, University of California.

For a period of three years a clubhouse adjoining the public school attended by members of the Adolescent Study was operated as a recreational center and for the observation of their leisure time behavior. A staff offered opportunities for participation in such activities as photography, carpentry, art, and dramatics.

Classes of data collected in the clubhouse situation include: (1) records of attendance and activities; (2) ratings of behavior (a) in the

company of the same sex, and (b) in mixed groups; (3) descriptive records of evening parties as well as of day-to-day social relationships; (4) conversations of small groups; (5) products of art and dramatic groups; (6) estimates of reputation and expressions of social attitudes as recorded by the boys and girls themselves.

The study of these data in conjunction with other sources of information about the same population led to the following conclusions: (1) Social activities of mixed groups rose to a position of leading importance for the majority of this group of adolescents. (2) Individual differences in preferred activities bore significant relationships to factors of physique, appearance, and the degree of physical maturity. They were also related to athletic achievement, established attitudes toward parents and sibs, sociability, and many other behavior characteristics. (3) Sex differences in social maturity were related to the characteristic lag of boys in onset of the growth spurt behind girls of the same age. (4) The motivation underlying the choices of activities by boys and girls was principally directed toward the achievement of social status, or of acceptability to a social group. [15 min., slides.]

10:55 A.M. *Individual Differences as Related to Autocratic and Democratic Group Atmospheres.* RONALD LIPPITT and RALPH K. WHITE, Cornell University.

This is a second report on the program of research in group atmospheres which was begun by Lippitt in 1937 and continued by Lippitt and White in 1938, under the direction of Professor Kurt Lewin at the Iowa Child Welfare Research Station. A preliminary report last year stressed the nature of the experimental controls, and three generalizations about the atmospheres themselves: (1) Autocracy tended to bring out one or the other of two dissimilar patterns of behavior, apathy and aggression; (2) "laissez-faire," in which there was a minimum of adult participation, proved decidedly different from democracy; (3) friendly behavior was most frequent in democracy, hostile behavior in laissez-faire and in the aggressive reaction to autocracy. Much of this aggression was directed against scapegoats.

Further analysis of the data has been concerned especially with individual differences. One conclusion, for example, is that, in groups characterized by the apathetic reaction to autocracy, individual differences in behavior tend to disappear. Individuals tend to be "run in the same mold." Quantitative data have also been obtained on the behavior of each adult leader, showing how he extended or limited the children's psychological "space of free movement"; the behavior of the boys before the leader arrives or when he leaves the room; reactions to hostile strangers; factors associated with the outbreak of intergroup hostility; analysis of the data in terms of psychologically meaningful time units (using in modified form a technique developed by Barker and Dembo); analyses of stenographic records in terms of 124 psychologically-defined categories; reliability data; correlations with Rorschach data; three interviews with each child; interviews with teachers and parents, giving clues as to the historical origin of individual differences in reaction to authority. [15 min., slides.]

SENSORY FUNCTIONS

Wednesday, September 6, 1:30 P.M.

Auditorium, Education Building

HERBERT S. LANGFELD, Chairman

1:30 P.M. *The Importance of Impedance-Matching in Studies of Vibro-Tactile Sensitivity.* LOUIS D. GOODFELLOW, Northwestern University.

Recent studies show that many of the conflicting data reported in the literature of vibro-tactile sensitivity can be reconciled by an analysis of the actual experimental conditions. The age-old argument between those experimentalists whose data limits the perception of vibration to the skin and those whose results link the perception of vibration with deep sensitivity takes on a new aspect in the light of recent research which indicates that both deep and superficial sensitivity are involved, the relative amounts being a function of the characteristics of the vibrator.

The chief source of the conflicting results reported in this field appears to be in the almost universal assumption that the vibration applied to the skin is the actual stimulus. Studies on the physical characteristics of the vibrator indicate that the particular end-organs stimulated and the amount of energy transmitted to them varies for different types of vibrators. The match in mechanical impedance between the skin and the vibrator is important. For heavy well-matched vibrators, deep sensitivity is primarily involved in the perception of vibration, but with small poorly matched vibrators such as have been frequently used in the past, deep sensitivity is of little importance. Consequently, psycho-physical data on such topics as threshold values, adaptation, fatigue, frequency characteristics, and discrimination depend on the characteristics of the vibrator, which determine the relative amounts of deep and superficial sensitivity involved, and the amount of stimulation reaching them. [15 min.]

1:50 P.M. *A Possible Receptor of Cutaneous Pressure and Vibration.*
B. VON HALLER GILMER, Carnegie Institute of Technology.

The present investigation has been an attempt to determine the possible sense organs of pressure and vibration by means of cutaneous excision. Recent experimental evidence has shown that points on the skin most sensitive to pressure stimulation are likewise very sensitive to vibratory stimuli, induced both mechanically and by the use of alternating electrical currents. "Pressure-vibration spots" on several regions of the back and arms were removed surgically and an histological examination of the underlying tissue was made. The histological analyses of the biopsies revealed what is believed to be glomus bodies. Control biopsies of spots insensitive to pressure and vibration did not contain the glomus organ. The possible functions of the glomus body as a receptor for cutaneous pressure and vibration are discussed in light of the present results. [15 min., slides.]

2:10 P.M. *Summation With Weak Visual Stimuli.* WARREN W. WILCOX, Albion College.

In this experiment, the size of the two stimulus patches was held constant and their separation varied. Summation thresholds were determined by reducing the illumination until the patches appeared homogeneous with the background.

With stimulus patches either lighter or darker than the background, the summative effect was found to cover between 30 and 40 minutes of visual angle within the fovea. Lighted stimulus patches showed less summative effect than did dark patches on a lighter ground. Summation decreased with the decrease in size of the stimulus patches and with an increase in the level of illumination.

The results indicate that the summative effect is due to the configuration of the stimulus rather than to the distribution of the anatomical units of the eye, since with the same illumination the summation threshold has widely different values. [10 min.]

2:25 P.M. *The Effects of Low Oxygen Tension and Low Blood Sugar on Dark Adaptation.* R. A. MCFARLAND and W. H. FORBES, Harvard University.

Numerous experiments have demonstrated that the efficiency of sensory and mental functions depends upon the amount of oxygen being delivered to the nervous tissue. These studies have contributed to an understanding of the fundamental nature of psycho-physiological mechanisms. The study of dark adaptation is important, both from the point of view of the practical implications in night driving and in aviation and from the point of view of understanding the functioning of the central nervous system.

The thresholds relating to dark adaptation were made with the Hecht adaptometer. The experiments in low oxygen were carried out in a chamber in which the partial pressure of oxygen was diminished with nitrogen. The blood sugar was reduced by the subcutaneous injection of from 5 to 10 units of insulin, the exact amount being administered in relation to body weight. In the low oxygen series the measurement of dark adaptation was carried out at simulated altitudes varying from 11,000 to 20,000 feet. At the higher altitudes, while the subjects were still dark adapted, the effects of administering glucose were analyzed. Glucose was also given following the injection of insulin while the subjects were still dark adapted.

The results indicate that dark adaptation can be affected either by reducing the blood sugar with insulin or by lowering the partial pressure of oxygen, the effects being more striking in the latter. Following the injection of insulin or the deprivation of oxygen, the administration of glucose tends to increase light sensitivity in the dark adapted eye, although the effects are not completely counteracted by such procedures. At approximately 18,000 feet, the threshold for light sensitivity is raised by approximately 1 log unit, the extent of the change varying directly with the physiological characteristics of each subject.

The results suggest that dark adaptation may be impaired by reducing

the amount of oxygen in the nervous tissue, either directly, by deprivation of oxygen, or indirectly, by lowering the blood sugar. The results also indicate that the changes are not concerned with the regeneration of the photo-sensitive substances of the visual mechanism, but with the neural elements of the retina and the central nervous system. [15 min., slides.]

2:45 P.M. *Stereoscopic Vision in Preschool Children.* L. F. BECK, University of Oregon.

In this experiment a more or less naturalistic setting was arranged where the child could reveal through his *spontaneous* reactions the presence or absence of stereoscopic vision. Twenty youngsters, two to six years old, viewed through polarized spectacles two superimposed, polarized, colored pictures of a doll projected life-size on a ground-glass screen. To an adult, the pictures produced a stereoscopic illusion of the doll's being held midway between the observer and the screen.

All the children, irrespective of age, reached for the doll several inches in front of the screen. That the stereoscopic illusion took on the appearance of reality was shown by verbal comments of which the following are typical: "I'm touching her nose but I can't feel her. Why can't I?" "I put my hand right through the doll."

With the elimination of one image, the children then localized the doll at the plane of the screen. Some of the older ones spontaneously commented on the movement of the doll back to the screen, and the increase in the apparent size of the doll when seen at the greater phenomenal distance. These results show (1) that children as young as two years have well developed stereoscopic vision, and (2) the importance of convergence as a factor in the perception of size. Beth Johnson collaborated in this study. [15 min., slides.]

3:05 P.M. *Pitch and Frequency Modulation.* DON LEWIS, State University of Iowa.

This paper deals with an investigation of the pitch of sounds characterized by frequency modulation. It has to do mainly with the perceived extent of what may be called pitch glides. By means of a specially designed variable condenser, the frequency of an oscillator could be modulated (varied) in several different ways, with the intensity of output remaining essentially constant. Modulation of either linear or sinusoidal form could be obtained, and the amount and rate of modulation were both subject to control. It was possible to produce, among others, the following types of variation: (a) isolated frequency sweeps, either upward or downward in direction; (b) sweeps, either upward or downward, at the beginning or end of a steady-state sound; (c) periodic modulation, that is, frequency vibrato. Sounds with vibrato were studied only casually. Main emphasis was placed upon securing information on thresholds for bare perception of pitch change and on perceived extent of slides, always as a function of amount and rate of modulation.

The experimental data are interpreted to indicate their probable bearing on problems of pitch perception in speech and music. The data are further shown to have a significant bearing on auditory theory in that they reveal the great rapidity with which the ear responds to sounds of

continuously and extremely rapidly varying frequency. An explanation of the results in terms of typical modulation theory is rather unconvincing. Doubt thus seems to be thrown upon the view that the ear can be regarded as a simple analyzer for short pulses of sound. An alternate view, based upon hydraulic principles and utilizing the concept of time rate of change of excess pressure, is set forth for consideration. (Assistance in the investigation was given by Grant Fairbanks, Milton Cowan, and Abe Pepinsky.) [15 min., slides.]

3:25 P.M. *The Attribute of Damping in Auditory Discrimination.*
FRANKLIN HENRY, University of California.

The identification of objects by virtue of the characteristic sounds they emit when physically disturbed is probably based primarily on pitch and damping. The problem of discriminatory limits for environmental sounds of this type was approached by electrically producing damped tones in the earphones of human subjects and determining difference limens by a modification of the constant method. The present report is concerned with the difference limen for damping.

The average limen of 7 subjects for a 500 cycle sound having a damping coefficient of 30, ranged from 3.5 at 80 db. above threshold to 15.0 at 20 db. At 60 db. the Weber ratio was relatively constant as the coefficient was altered over the range 30 to 250. The ratio increased with increased damping at low intensities, the change being greatest between coefficients of 100 and 175.

The damping limen expressed as a temporal increment was substantially unaltered as the above-threshold duration of the tone was changed from .08 to .31 seconds by changing its intensity, but changed consistently when duration was altered by changing the damping level. This indicated that damping or some similar attribute (not duration as such) formed the basis of the discrimination. The difference limen for intensity was found to be of the order of 4 to 6 db. which was of sufficient magnitude to eliminate intensity difference as an important factor in judging difference in damping. [15 min.]

3:45 P.M. *The Relationship Between Age and Tonal Patterns in Song-Isolated Roller Canaries.* CONSTANCE CHANDLER, University of Southern California.

The purpose of this study was to analyze the song development of eight roller canaries raised under conditions of song-isolation, in order to determine the relationship between chronological age and (a) rate; (b) repetition; and (c) regularity of tonal patterns. Kymograms were made from phonograph records which contained representative song behavior for the entire period of song development. Tabulation of the number and rate per second of tonal patterns was made from the kymograms. The major findings were:

- (1) Tonal patterns were sung, in general, at the same median rate and with the same variability of rate throughout the developmental period.
- (2) There was a relationship between the number of patterns of equal rate occurring in sequence and (a) chronological age; and (b) the age

of earliest song behavior. (3) There was a relationship between age and regularity of tonal patterns. [10 min.]

4:00 P.M. *The Measurement of Bird Responses to Degrees of Intensity of Auditory Stimulation.* MILTON METFESSEL, The University of Southern California.

The responses of a group of male roller canaries to varying intensities of call notes of a hen were individually recorded and measured during the mating season. A phonograph record with the call notes was played with an electrical device into a sound attenuation cage containing a male bird. Six wide steps of intensity were possible by means of a calibrated resistance unit in the input of the amplifier. These steps were numbered from 1 to 6 in order from greatest to least energy.

The original tests were followed by a control series, in which all conditions of the test series were maintained except that no sounds were played into the cage for steps 3, 4, 5, and 6. This gave a measure of the free song that would be expected during periods of no stimulation.

By this procedure, step 4 was determined as near the lower limit of bird song response to sound energy. The lower limit of hearing of a group of human observers occurred approximately in the region of step 3, with no hearing at step 4. No attempts have been made to measure minute differences between human beings and birds, as the interest in this study was restricted to determine whether bird responses to auditory energy would occur outside the same order of magnitude of sound energy as that at the lower limit of hearing of human beings.

This method offers comparable results to those obtained by a conditioning method, in which birds were trained to fly from a perch when a sound was generated, and which resulted in neurotic behaviors at low sound energies, worked out in collaboration with Mr. Lee Stockford. [15 min., slides, phonograph record.]

PHYSIOLOGICAL ASPECTS OF EMOTION AND MOTIVATION

Wednesday, September 6, 1:30 P.M.

Room 2, Education Building

GEORGE M. STRATTON, Chairman

1:30 P.M. *Pulse Rate Response of Adolescents to Ideational and Sensory Stimuli.* NATHAN W. SHOCK, University of California.

Changes in pulse rate after stimulation have been recorded in a group of 50 girls and 50 boys—aged 12 years. Two lists of 20 words each were administered to each child with instructions for free association. The experimental words were selected to contain four buffer, four pleasant, four unpleasant and four indifferent words determined by ratings of over one hundred adolescents. Ratings of pleasantness or unpleasantness of each word were obtained from the subjects during the test. Eight sound stimuli were presented to the subjects. Ratings of pleasantness-unpleasantness, and degree of startle produced were obtained. The sound stimuli included: harmonic chord, siren, automobile horn, gong and cap pistol shot.

Pulse rate was recorded photographically from a pneumatic cuff attached to the ankle of the subject. Preliminary analysis showed that if the pulse rate is counted over 10 or 15 second intervals, changes are missed; if one-second intervals are used chance fluctuations and errors in reading the records are large. An optimal interval of 3 seconds was used in the study. Reliability coefficients of pulse rate were found to be 0.85–0.95. All association word stimuli were followed by cardiac acceleration in the group average, with a maximum increase of 5 beats per minute which was attained 12 seconds after the stimulus was given. In contrast to changes of skin resistance, no significant differences between cardiac acceleration following pleasant, unpleasant or indifferent words were found. Sound stimuli produced a decrease in the average pulse rate of 3 beats per minute 3 or 6 seconds after the stimulus with a slight rise in rate at 12 seconds. The displacement was not significantly related to degree of startle reported by the subject. The physiological implications of this finding are discussed. [15 min., slides.]

1:50 P.M. *A New Approach to the Old Problem of Emotional Stability.*

V. E. FISHER, Idaho State Hospital South, and R. I. WATSON, University of Idaho, Southern Branch.

This paper is based on a somewhat new conception of emotional stability, and presents the approach to the measurement of stability which the conception suggests. Emotional stability appears as the ratio existing between emotional arousability and emotional tolerance. By arousability we mean the individual's propensity to respond emotionally in his everyday life. Here we have at least three dimensions or variants: strength of response, duration of response and frequency of response.

An individual's emotional tolerance is his capacity to handle his emotional tension. Chief among the aspects of tolerance, found upon

analysis, are the capacities to withstand intense or prolonged emotional tension, to vent or discharge emotional tension, and to govern or direct emotional tension.

Emotional stability, then, depends upon a balanced relationship between arousability and tolerance. A person with high tolerance can adequately cope with relatively high arousability. A person with low tolerance, on the other hand, possesses stability only if his arousability also is low. The person whose tolerance is relatively low and whose arousability is high is inevitably unstable.

An emotional stability inventory containing two kinds of items was constructed and given to more than three hundred college and school of education students. One hundred and twenty arousability items were scored on six-point scales for strength, duration and frequency. One hundred and fifty tolerance items were scored on a six-point scale for ability to withstand or to vent or to direct emotional tension.

From these total items those shown to be most valid by various statistical techniques were then given to fifty mild psychotic state hospital patients and to fifty psychoneurotic patients to derive an emotional stability quotient, expressed as, tolerance divided by arousability equals emotional stability quotient, or, simply, $\frac{T}{A} = \text{ESQ}$. [15 min.]

2:10 P.M. *A Comparison of the Weights of the Adrenal, Thyroid and Pituitary Glands of Emotional and Non-emotional Strains of Rats.*
CALVIN S. HALL, Western Reserve University.

The results reported in this paper were obtained in collaboration with Dr. Eleanor Yeakel and Miss Ruth Rhoades of the Biology Department of Western Reserve University.

Two strains of rats, one emotional in behavior, the other relatively phlegmatic, are being selectively bred. The test of emotionality is defecation and urination in an open field situation. Five generations have been tested to date and the difference in emotionality between the strains in the fifth generation is marked.

A program of research has been initiated to determine the biological basis for this difference in emotionality. The first step in this program was a comparative study of gland size. The adrenals and thyroids of 55 F_3 and F_4 emotional rats and 55 F_3 and F_4 non-emotional rats were excised and weighed. The weight of the pituitary was determined for 30 F_4 emotional rats and 35 F_4 non-emotional rats. The average weights of these glands, relative to body weight, are greater for the emotional animals than for the phlegmatic rats. These results suggest that emotional behavior is associated with the endocrine system and that individual differences in gland size are inherited. [15 min., slides.]

2:30 P.M. *The Interrelationship of Six Different Situations in the Measurement of Emotionality in the Adult Albino Rat.* MILTON M. PARKER, Ohio State University.

The situations were: a brightly illuminated open field; a sound-proofed box provided with a loud buzzer; an apparatus capable of admin-

istering a drop at approximately "g"; an apparatus equipped with a glass floor which, when tilted, threw the animal off balance and forced it to slide; a swimming tank; an apparatus which restricted the activity of the animal uniformly, and almost completely.

From the standpoint of the defecation response, all the situations were emotion-provoking. Standardization, on the basis of defecation in odd *versus* even trials, showed the reliability for each situation to be not less than 0.85.

Individual differences in the ability to adjust (inhibit defecation) were marked. Sex differences were negligible except in the case of the arena. For purposes of correlating the ability to adjust in one situation with that shown in adjusting to the other five, three successive trials with no defecation were set as the criterion.

The fifteen intercorrelations obtained between the various combinations of the six situations were all beyond Fischer's "one per cent point" of significance. Males and females correlated approximately alike. Correlation of the results of one situation with the pooled results of the remaining five showed no significant superiority for any single situation.

The consistency and statistical significance of the results argue strongly for the importance of the somatic determiners of emotionality. Despite this, however, the coefficients of alienation indicate a variance whose magnitude is probably larger than the experimental error involved in the six tests. [15 min., slides.]

2:50 P.M. *A Summary of Four Years' Work on the Social Behavior of Albino Rats.* ROBERT HALL BRUCE, University of Wyoming.

Problem: What is the effect of the presence of one or two rats upon the behavior of a single animal in the experimental field? Does shifting the amount of the thirst drive have any effect?

Procedure: Rats were run in an open field, and the following measures were taken: (1) time to water; (2) time of first drink; (3) excess distance covered; (4) amount of water consumed. All animals were motivated by varying amounts of water deprivation. Fisher "t's" were calculated to indicate reliability of means.

Results: The presence of a trained animal did not consistently aid the naïve animal to eliminate excess distance or decrease the time taken to reach the water. There was no evidence of tutorial learning nor can the concept "imitation" be legitimately applied. The time of the first drink was consistently and significantly less when two animals were in the experimental situation whether one or both could or could not drink from the same source of water. When the experimental conditions were such that both animals could drink at the same time from one source, the trained animal did not drink consistently more; when only one animal could drink from the source, the trained animals drank consistently more.

Giving $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ of the normal water intake per rat alternately to two groups did not significantly affect time to water, excess distance, or time of first drink. Satiation did affect these measures. The amount of water consumed varied with the amount given before the run. [15 min., slides.]

3:10 P.M. *The Innate Differential in the Social Learning of Fowls.*
T. H. HOWELLS, University of Colorado.

Most studies of either innate or environmental factors involve a specified treatment or training for certain individuals while other equivalent individuals are not so treated. Differences which appear are commonly ascribed to training, while similarities which develop in spite of such treatment are commonly termed hereditary. Learning experiments involving equated experimental and control groups, and also studies of separated identical twins, are examples. In each instance the innate factor is supposedly held constant while the environmental factor is varied. The complement of this procedure in which the environment is kept constant from birth while the innate factors are varied has seldom been attempted. It was the purpose of this experiment to compare the social adjustments of two varieties of fowls toward own and other kind when the environments of both were equated from birth.

Equal numbers of two varieties of fowls (*e.g.*, chickens and ducks, or bantams and leghorns) were hatched at the same time from incubators, and were reared together in the same cage. When old enough individuals were trained in a Y discrimination box in which pairs of animals of own and other kind, from the rearing cage, served as cues indicating respectively food and shock, and *vice versa*. Animals completing this training were next trained (positively and negatively) to substitute cue animals of the same kind. The aim was to discover any tendency to generalize or react to kind, instead of to specific individuals, as shown by savings in relearning.

Results indicate tentatively that, with equal social contacts from birth, animals (1) learn to react differently to individuals of their own kind as compared with another kind, and (2) tend to generalize in terms of kind. [15 min., slides.]

3:30 P.M. *The Role of Hunger in the Filial Behavior of the Young Guinea Pig.* GEORGENE H. SEWARD, Connecticut College.

In the course of experiments on the drive of mother guinea pigs toward their young, we were impressed with the fact that the young seemed to show an even stronger drive toward their mothers. This raised the question as to whether this behavior is exclusively hunger-motivated. The present experiment was designed to throw light upon this question.

"Filial drive" was measured by the Hurdle Box technique previously described. According to this method, after an interval of separation from the mother, the young animal's drive is measured by the average time of crossing a barrier to reach her. Following this procedure we obtained records of normal filial behavior throughout the suckling period on 22 guinea pigs. The trend of these results was toward increased rather than decreased speed of crossing. This finding indicated stronger drive toward the mother in spite of the fact that the animals were presumably becoming less dependent upon her for nourishment.

In order to rule out hunger motivation more systematically a further refinement was introduced with a new group of six animals. In half the

trials they were artificially fed milk to satiation during the separation interval. In the other half, they were merely given a corresponding amount of handling as a control. Although these results reveal greater drive on the "unfed" trials, there is, nevertheless, a strong residual drive even after feeding. Obviously this cannot be attributed to hunger. Interpretation in terms of social conditioning is suggested as a hypothesis for further experimentation.

This study was aided by funds from the National Research Council Committee on Sex Problems through the Department of Anatomy, Cornell University Medical College. [15 min., slides.]

TECHNIQUES OF MEASUREMENT OF TRAITS AND ATTITUDES

Wednesday, September 6, 1:30 P.M.

Room 521, Hydraulic Laboratory

FLOYD H. ALLPORT, Chairman

1:30 P.M. *Comparative Study of the Character Traits of Young Orphanage and Non-orphanage Children.* LEIGH PECK, University of Texas.

Sixteen performance tests designed to measure phases of character development were adapted from the Hartshorne and May techniques for use with children at the nursery school, kindergarten, and primary levels. Honesty, persistence, inhibition, altruism, and social behavior were the phases of character studied. After the standardization of the techniques, groups of 71 orphanage and 84 non-orphanage children from three to ten years of age were tested. A retest of both groups was made at the end of seven months. The orphanage children showed a higher average of total character traits, but the non-orphanage children showed a greater improvement over the seven-month period. Both age and intelligence were positively related to scores on the character tests. [10 min.]

1:45 P.M. *A Study of the Interest-Attitude Test Scores of Delinquent Boys.* M. E. ODOROFF, Division of Vocational Rehabilitation, St. Paul, Minnesota, and D. B. HARRIS, Stanford University.

Pressey Interest-Attitude test scores for 325 delinquent boys from the Minnesota State Training School average somewhat below the norms for corresponding age groups of unselected boys. This difference is somewhat less than that found by M. A. Durea, who studied a similar group of delinquents (*Jr. Abn. and Soc. Psychol.*, 1937). The average "emotional ages" of moron, borderline, and dull groups (classified on the basis of Kuhlmann-Binet I.Q.'s) are below the corresponding average chronological ages. This "emotional retardation" is, however, not so great as the mental retardation evinced by these same special groups. Correlational analysis reveals low positive relationships between emotional age

and mental and chronological ages, respectively. Even though the Interest-Attitude test be accepted as valid, the reliability of younger subjects' responses perhaps may be questioned because of interpretative difficulties with a number of the stimulus words. [10 min.]

2:00 P.M. *Comparisons Between Self-Estimates and Classmates' Estimates of Personality During Adolescence.* CAROLINE McCANN TRYON, University of California.

On a verbal portrait-matching (Guess Who) test each subject was instructed to match members of his class, including himself, to the descriptive pictures. There were some twenty pairs of word pictures, one in each pair describing the negative, inactive or undesirable aspect of a personality trait and the other the positive, active or desirable aspect. No one was forced to make judgments since the directions stated that the subject could skip any word picture if he could think of no one in the group who matched it. The test was administered eight times to the same group of children during a period of seven years (6th to 12th grades).

The data are analyzed in terms of (1) the incidence of self-mention for the group at each testing; (2) the degree to which agreement and disagreement between the individual's opinion of himself and his classmates' opinion of him is idiosyncratic; and (3) the tendency to restrict self-mention to acceptable or desirable qualities.

The analyses suggest the following general conclusions: (1) There is a marked tendency for self-mention to decrease as age increases; (2) for some of the traits it is as idiosyncratic to agree with one's classmates' opinion about oneself as it is to disagree; (3) there is a tendency to look more favorably upon one's own personality qualities than one's peers do, but this tendency varies widely among the traits. Factors related to this variation will be considered. [15 min., slides.]

2:20 P.M. *The Effect of a Knowledge of the Situation upon Judgment of Emotion from Facial Expressions Aroused in Everyday Life.* NORMAN L. MUNN, Vanderbilt University.

Candid camera photographs selected from back issues of *Life* and *Look* were made into lantern slides. The slides of one set pictured the whole situation. Those of the other contained only an enlargement of the subject's head. The latter slides were shown to 90 psychology students instructed to judge the subjects' emotional reactions. A week later these students judged the emotion expressed by the same faces, but while viewing them in their original setting. No terminology was suggested in either of these experiments. From the most frequent terms used by this group, a vocabulary for a further experiment was arranged. Sixty-five psychology students on another campus were given the same test, but this time with a suggested vocabulary to which their own terms might be added.

The predominant judgments of both groups were in most instances quite similar. Seven of the expressions were judged with an accuracy (agreement) of from 65 to 99 per cent by both groups and there was no significant change upon preceiving the situation. Two of these expressions were designated *joy*. The others were *terror*, *pain*, *anxiety*, *sur-*

prise, and disappointment. In the case of several other expressions, judgment changed markedly with knowledge of the precipitating circumstances. For instance, a predominant report of *sorrow* changed to *determination*, one of *anxiety* to *horror*, and one of *terror* to *surprise*. Some expressions aroused widely varying interpretations under both conditions.

Even where there was lack of agreement concerning the precise emotion being experienced, observers evidenced a marked ability to judge the affective tone of the expression. These experiments indicate the value of candid-camera material for research on emotional behavior. [15 min., slides.]

2:40 P.M. *Highlights in the Literature of Psychological Sex Differences Published Since 1920.* WINIFRED B. JOHNSON, GEORGE KUZNETS, and LEWIS M. TERMAN, Stanford University.

The report is based on a careful study of practically all the experimental literature on sex differences published in the English language since 1920. The areas covered include measured abilities, achievement of various kinds, and numerous personality variables. The resultant picture of the mental and behavior patterns exhibited by men and women of the white race in present-day Occidental culture constitutes a norm against which later changes in pattern may be evaluated. A striking improvement has taken place since 1920 in the quality of the investigations reported in this field. The authors are indebted to Olga McNemar for assistance in the conduct of the survey. [15 min.]

3:00 P.M. *The Comparative Efficiency of Various Methods of Weighting Interest Test Items.* ROBERT T. ROCK, JR., and ALEXANDER WESMAN, Fordham University.

Problem: To determine the relative efficiency of the weighting procedures commonly used in developing scoring keys for interest tests and to compare their efficiency with that of other possible weighting procedures.

Procedure: An interest-attitude test consisting of 100 items selected from the Terman-Miles Masculinity-Femininity Test was administered to 300 men and 300 women. Alternate cases were selected to form primary and secondary groups, each consisting of 150 men and 150 women. The responses of the primary groups were tabulated and weights for each of the possible responses to the 100 items were calculated by twenty different methods, including the following: the Cowdery-Kelley-Strong formula; the Kelley 1934 formula; critical ratio; critical ratio squared; the first four powers of per cent differences in response frequency; chi square; a modification of Flanagan's method of successive approximations; and a variety of "reduced" and "unit" weighting schemes. The weights thus calculated from the tabulated responses of the primary groups were then used for scoring the tests marked by the secondary groups. A measure of the efficiency of each weighting method in separating the secondary groups was obtained by determining from the total scores yielded by the scoring key based on each weighting procedure, the per cent of overlapping of the scores of men and women.

Results: The data of this study indicate that, in general, "reduced" and "unit" weighting methods are considerably less efficient in separating secondary groups than methods using larger and more variable scoring weights. The Cowdery-Kelley-Strong and the Kelley 1934 formulas did not differ in efficiency, and several weighting procedures were found to equal or surpass the effectiveness of these formulas. [15 min.]

GROWTH AND DEVELOPMENT

Thursday, September 7, 10:30 A.M.

Room 2000, Life Sciences Building, University of California

MAUD A. MERRILL, Chairman

10:30 A.M. "*Play Techniques*" in *Preschool as an Aid in Guidance*. DOROTHY WALTER BARUCH, Broadoaks School of Education, Whittier College.

Clinical procedures with "problem" children suggested the question: Can "play techniques" with "normal" children yield indications of emotional needs, and be of value in guidance?

Forty children were given play, under controlled conditions, with dolls representing their own family members. To make procedures compatible with usual preschool staffing, and hence usable in other schools, the investigation concerned itself with what might happen with each child in a fifteen minute period. Full records were taken both of child behavior and worker participation.

In many instances, revealing indications appeared. Often these had not shown in other phases of school behavior. They sometimes gave leads borne out by further investigation of family data. They sometimes corroborated staff hypotheses (based on parents' reports and school records) that children were reacting to certain tensions and pressures. The majority of cases yielded data of value in guidance. [10 min.]

10:45 A.M. *The Substitute Value of Activities for Children of Different Age Levels*. DAN L. ADLER, Iowa Child Welfare Research Station, State University of Iowa.

Observation indicated that young elementary school children react behaviorally to *identical* task-activities as if they were different. Older children seemed to react to identical task-activities at one time as if they *were* identical, at other times as if they were different. These reactions seemed to occur despite the children's ability to *perceive* the activities as the same.

To test the validity of these observations, sixty children between the ages of seven and eleven years were placed in each of three experimental situations as follows:

Control situation (I): Presentation of task A, interruption, presentation of task B physically and cognitively different from A.

Concrete situation (II): Presentation of task L, interruption, presentation of task M physically identical to L, but cognitively differentiated. L was referred to here as "Mr. Brown's house," M, as "Mr. Jones' house."

Categorical situation (III): Presentation of task Y, interruption, presentation of task Z physically identical to Y, and cognitively included in the same category. Thus Y and Z were referred to together as "house building material."

One would expect that the original task would be resumed when the task following interruption did not serve as a substitute for it. It was found that the majority of young children resumed the original task in all situations. The older children resumed this task in situations I and II, but not in the categorical situation. The biserial correlation between resumption in the categorical situation and chronological age was $-.65$; between resumption in this situation and mental age, $-.38$.

Despite the ability to *perceive* identical tasks as identical, the tendency to *react* to them as different is seen as a function of *chronological* age, and the type of situation presented. [15 min., slides.]

11:05 A.M. *Relationships Between Menarcheal Age, Behavior Disorders and Intelligence.* MARTIN L. REYMERT, Mooseheart Laboratory for Child Research, Mooseheart, Illinois.

The menstruation records of 138 girls who attained menarche at Mooseheart, and on whom we have exact information on every menstrual period thereafter, form the data of this report.

The median age at menarche is 13.1 years, $Q=7.2$ months. The correlation between the age at menarche and recent Binet I.Q. was $-0.07 \pm .08$. For a selected group, $2\frac{1}{2}$ years removed from menarche, there is little regularity approaching a once-in-28-days standard. Certain data concerning body type and menarche will be presented.

No significant difference was noted in the menarcheal age of problem *vs.* non-problem children, nor in the time elapsed since menarche. Nor were the problem children more irregular in the function.

The dependability of "recalled" data was checked. The correlation between actual age at menarche and the age recalled $1\frac{1}{2}$ years afterwards was $0.79 \pm .05$. [10 min.]

11:20 A.M. *The Predictive Value of Several Different Measures of Mental Growth During the First Nine Years.* NANCY BAYLEY, University of California.

Forty-eight of the children in the First Berkeley Growth Study have been tested at 33 ages from birth through their ninth year. General tests of mental ability showed irregular progress in mental growth, especially during the first years.

In an attempt to find some measures of mental ability which would rate the children consistently during early childhood several combinations of scores were studied.

A "Developmental Score" made up of the sum of the items of the

separate mental and motor tests yielded no greater consistency than did the mental test alone.

A selection of items in the California Preschool Mental Scale improved, slightly, the correlations of the two and three year tests with later performance, but the improvement was not great enough to produce constant scores over a period of four or five years.

Tests of vocabulary given from six to nine years of age gave scores moderately related to language tests at three and three and a half years, and were not significantly related to the age of first talking or to early mental test scores.

Tests of form-board and puzzle-board performance (at five and a half to eight and a half years), although related to mental test and vocabulary scores at similar ages, were unrelated to tests of ability during the first year.

It was concluded that mental organization changes with growth, and that this change is especially rapid before two years of age. [15 min., slides.]

11:40 A.M. *Sibling Resemblance in Intelligence, in Relation to Natal Interval.* HERBERT S. CONRAD, Institute of Child Welfare and College of Agriculture, University of California.

Problem: What is the comparative resemblance, in intelligence, of siblings close together in age *vs.* siblings farther apart in age? What are the implications of similarity *vs.* difference of resemblance in these two contrasted groups of siblings?

Procedure: A large unselected sample of children in rural New England were tested on either the Stanford-Binet or Army Alpha intelligence tests (occasionally both). Raw scores in each test were converted to sigma scores for each age-group. Correlations were computed between siblings of short natal interval (under three years); and between siblings of relatively long natal interval (three years or over).

Results: On the average, the correlations between siblings of long natal interval is about .03 less than the correlation between those of short (.52 *vs.* .49). An incidental finding is the higher correlation between opposite-sex siblings than between same-sex siblings. The results are based on a total of 778 sibling pairs (this becomes 1,556 by conventional double-entry for an intraclass r).

Interpretations: The findings are interpreted as indicating the absence of intra-sibship environmental influence on intelligence in the present sample. This does not preclude the possibility of inter-sibship influences, but weakens their probable significance. The possible effect of certain extraneous or spurious factors (*e.g.*, incomparability of Army Alpha *vs.* Stanford-Binet test, relation of parental age to offspring-intelligence, etc.) has been investigated, and found of either negligible or zero influence. A brief comparison is made between findings of the present study and results by other investigators.

Acknowledgment: The data for the present study were collected by Harold E. Jones, with the assistance of Mary C. Jones and the writer. [15 min.]

12:00 M. *Age, Race and Responsiveness of Levels of Aspiration to Success and Failure.* DONALD K. ADAMS, Duke University.

A group of 30 fourth-grade negro children was matched,¹ child for child, with a group of 30 fourth-grade white children in respect of age, sex, educational status, mental age (hence I.Q.) and approximate economic and occupational status of parents. Similarly matched groups (also of 30 each) of whites and negroes were selected from the eighth grade and from college juniors. Each of these 180 individuals was the subject of a series of experiments including one on levels of aspiration. In this experiment the subject threw five darts at a target, added up his score, and was asked to predict his score for the next throwing of the five darts. This was continued until he had made 16 throws (of all five darts) and 15 predictions or "bids."

If "success" be arbitrarily (and not very psychologically) defined as a score equal to or greater than the subject's bid and "failure" as a score less than that bid, individual differences are found in a variety of relations. The one here reported is the percentage of cases of "success" followed by an increased bid, and that of "failure" followed by a reduced bid, which might be taken as a crude measure of "realism." The former percentage was about the same (about 70%) for both fourth grade groups and for the negro college juniors and higher (82%) for the white college juniors. The latter percentage (cases of failure divided into cases of failure followed by reduction of bid) was lower (43%) for both college groups than for both fourth-grade groups (white 63%, negro 57%). Possible interpretations of this and other findings are discussed. [15 min.]

12:20 P.M. *Successive Reproductions of Visually Perceived Forms.* ARTHUR BERMAN, Institute of Child Welfare, University of California.

This study investigates the reorganizations in the drawings of young children when visually perceived forms are reproduced to the point of satiation (rejection).

Twenty-five children—mean chronological age 46.9 months and mean mental age 56.34 months—acted as subjects. They made a total of 429 drawings.

The experimental procedure was composed of two aspects. Group I was shown the original form—a circle with three dots within the circumference representing a face—only during the first replication, and thereafter it was recalled verbally by the experimenter. Group II had access to the original for every reproduction for it was constantly in the field of vision. The subject continued his reproductions until he rejected the task.

The data reveal a mean of 14.66 reproductions in a mean time of 12.50 minutes for Group I. The mean number of reproductions for Group II was 19.46 reproductions in 12.68 minutes.

In summary: (1) Reorganizations in the successive reproductions occur in the drawings of all our children. Following Wulf, these changes may be classified as *sharpening*, *preserving*, and *leveling*. All of these processes function throughout a series of reproductions and all may

appear in any single reproduction. (2) The tendency to *sharpen*, *preserve*, or *level* will continue when initiated until the satisfaction of the quasi-need, or the creation of a new reorganization. (3) A tendency in the drawings for increased complexity rather than simplicity was noted. (4) Reorganizations become more profuse in the distal stages of reproduction. Reproductions made in a satiated state are more disorganized than when no satiation is present. (5) The above factors operate similarly when the original is present in the visual field for every drawing.

It was concluded that satiation accentuates and distorts the normal process of graphic symbolization in the child.

Roma Tueller collaborated in this study. [15 min., slides.]

CONDITIONING

Thursday, September 7, 10:30 A.M.

Room. 2003, Life Sciences Building, University of California

CLARK L. HULL, Chairman

10:30 A.M. *The Effect of Conditioning upon the Original Response to the Conditioned Stimulus.* LILLIAN DICK, Sarah Lawrence College.

The investigation was undertaken to discover whether the data reported by Erofeeva, to the effect that the original response to the conditioned stimulus disappears when conditioning takes place, would be substantiated if such factors as precision of measurement of the response, nature of the stimuli and adaptation were taken into consideration.

Four groups of college students were used as subjects. With the first three groups the conditioned stimulus was a tone of high intensity and the lid reflex was the measured response. The unconditioned stimuli for the three groups were, respectively: the same tone as the conditioned stimulus, a bright light and a shock. In the first two cases the measured response to the unconditioned stimulus and the conditioned response were the same as the response to the conditioned stimulus. In the third case, the unconditioned and the conditioned responses were psychogalvanic reflexes. With Group IV the shock was the conditioned stimulus and the tone the unconditioned stimulus. The effect upon the original response of varying the relative intensities of the conditioned and unconditioned stimuli was investigated. Accurate records were obtained by using the Dodge pendulum-photochronograph and a galvanometer.

The conditioned response was successfully established and extinguished in thirty subjects and appeared in the first two groups and the fourth as an anticipation of the unconditioned stimulus. The results clearly indicate the retention of the original response when conditioning has occurred and fail to show any consistent relationship between its latency, amplitude or development and the latencies, amplitudes and development of the conditioned and unconditioned responses. The theoretical significance of these findings will be discussed. [15 min., slides.]

10:50 A.M. *"Positive" and "Negative" Conditioning, Without Contraction of the Essential Muscles During the Period of Training.* W. N. KELLOGG, Indiana University.

The problem of the present investigation was to study the function of the effector organs in the learning of a reaction involving those effectors. Is movement necessary for learning, or can the organism develop a localized conditioned reaction without ever associating an actual muscular contraction (in the conditioned member) with the conditioned stimulus?

In the attempt to throw light upon this question, the buzz-shock method of conditioning was employed to train dogs to flex the right hind leg. Throughout all of the training some of the preparations were prevented from moving the member which was shocked by a temporary blocking of the motor pathways to the flexing muscles. This involved pinching off the motor roots of seven of the spinal nerves in such a way that rapid regeneration would follow after the training had been completed (Cajal, Light and Gantt). Other non-operated animals, subjected to a similar conditioning procedure, were prevented from flexing the limb which was shocked, by mechanical means. Retention tests were made after sufficient time to allow for complete recovery of the operated specimens.

The results showed that some of the subjects in both groups had learned to lift the previously unmoved member to the buzz stimulus even though they had never associated an actual flexion with the buzz. The behavior of these animals was characterized by great activity in the free or non-paralyzed muscles throughout the period of training. Some of the quieter subjects, on the other hand, developed conditioned inhibitions, and received the shock punishment without learning to make a conditioned withdrawal. Explanatory data on these two divergent sorts of integration will be presented. [15 min., slides.]

11:10 A.M. *An Experimental Investigation of Chained Responses in Indirect Conditioning.* ROGER BROWN LOUCKS, University of Washington.

The present experiment constitutes a test of Shipley's hypothesis that indirect conditioning can be accounted for in terms of responses which are chained to peripheral proprioceptive stimuli. Utilizing rabbits, a tone was made the signal for a conditional hind foot movement based upon shock to the toes. Secondly, the shock at the toes was employed as a signal for a conditional blink based upon shock at the cheek. Finally, the tone was administered alone to ascertain whether the conditional foot movement would be accompanied by a blink even though lid closure had never been associated directly with the tone. Capacitance "pick-ups" registered the movements on a long-trace cathode ray tube.

Indirect conditioning, in rabbits, follows upon a period during which the tone will evoke a conditional foot movement, and shock at the foot (evoking reflex foot movement) elicits a conditional blink—in the complete absence of chaining. Thus, a conditional blink is evoked only by the shock at the foot and not by a foot movement elicited as a CR to the tone. When the training routine is repeated several times, the tone, given alone,

evokes a blink along with the conditional foot movement, even though the blink has never been directly associated with the foot movement. The lid response generally, but not invariably, trails the conditional foot movement.

As a final check upon the significance of peripheral proprioceptive cues, the animals were given a spinal anesthetic. Although all cues arising from the foot were thus eliminated, the tone continued to evoke the conditional blink. In rabbits, indirectly established CR's do not appear significantly dependent upon peripheral proprioceptive cues, and may even be demonstrated when the brain is largely isolated from the body. [15 min.]

11:30 A.M. *Thalamic Mediation in the Monkey of Affective Responses Capable of Being Conditioned.* JOHN A. BROMER, University of Wisconsin.

The localization of the cerebral receptive centers which mediate affective responses, and by inference affective consciousness, has never been conclusively demonstrated. The following experiment was designed as a critical test of the capacity of the thalamus to mediate affective responses after destruction of all appropriate cortical somesthetic centers.

Anatomical evidence indicates that the foot, arm, and face are separately represented in different thalamic areas and are discretely represented upon the cortex in the monkey. Thus cortical foot and arm somesthetic areas may be completely excised without destroying the cortical somesthetic representation of the face.

Frontal and parietal foot and arm areas were bilaterally extirpated in three monkeys. The block of extirpated tissue ran from the genu of the arcuate sulcus to the simian sulcus, and thus included any somesthetic foot or hand representation that may lie anterior to the central sulcus.

After operation, voluntary motion was limited to the face and neck. Vigorous movements of these parts resulted from painful or other forms of protopathic stimulation of the foot. Since all foot cortical representation had been destroyed, it was assumed that the facial responses to irritation of the foot were activated by thalamic sensory-affective centers.

Furthermore, head movements elicited by shock to the foot were conditioned to a bell stimulus in a few trials.

The existence of sensory-affective centers in the primate at sub-cortical levels furnishes additional evidence on the nature of emotional and motivational processes and their relation to learning.

These experiments were done in collaboration with Dr. H. F. Harlow. [15 min., slides.]

11:50 A.M. *Formation of Conditional Responses in the Cat and the Monkey During Inactivation of the Motor and of the Motor-somesthetic Cortex.* H. F. HARLOW, University of Wisconsin.

The purpose of this experiment was to determine the effect of complete inactivation of the motor and somesthetic cortex upon the formation of a conditioned emotional response.

The appropriate cortical areas were inactivated by freezing with ethyl chloride. The appearance of flaccid paralysis, abolition of reflexes

(including the corneal), and complete loss of excitability to electrical stimulation were taken as indicators of temporary loss of function.

Training for conditioning was carried out in four monkeys during inactivation of motor and premotor areas and in two monkeys and two cats while somesthetic and motor areas were frozen. The CS, a bell, was sounded for two minutes and overlapped the half-second presentation of the US, a faradic shock to the leg. From six to ten training trials were given in a single training period, and as many as three training periods, always with the appropriate cortical areas frozen, were utilized.

In spite of the fact that ethyl chloride freezing always resulted in some residual paralysis, conditioned responses were obtained in all subjects. These conditioned responses ranged in intensity from forceful closure and flutter of the eyelids to struggling movements involving the entire body.

These data strongly favor an "intra-cerebral" theory of learning, since no movement ever appeared to the conditioned stimulus and since inactivation of somesthetic areas eliminated the possibility of spatially localizable proprioceptive stimuli fulfilling any function in the conditioning process.

Inferentially, these data bear on the motor theories of consciousness, and on the various theories of emotion which assume that proprioceptive sensations mediated by cortical centers play some essential rôle in awareness of learned or unlearned emotions.

These experiments were done in collaboration with Mr. John A. Bromer. [15 min., slides.]

12:10 P.M. *Pupillary Conditioning to Auditory Stimuli Near the Absolute Threshold.* ERNEST R. HILGARD and JOHN A. OHLSON, Stanford University.

The experiments were designed to test Baker's finding that pupillary responses may be conditioned in a few trials to auditory stimuli near the absolute threshold. Intensities of stimuli and time intervals comparable to his were used, although there were some modifications in procedure. Attempted conditioned constriction (10 subjects) and conditioned dilation (10 subjects) failed when the fixation object was 1 meter from the eyes. When, however, the fixation object was placed at 15 cm. from the eyes, positive results were obtained within 8 reinforcements for both conditioned constriction and dilation in a majority of the 20 subjects tested under these circumstances. The data suggest that pupillary changes associated with convergence upon a near fixation point may be important in determining the conditioned responses. [10 min., slides.]

12:25 P.M. *The Effect of Inhibitory and Facilitatory Attitudes on Eyelid Conditioning.* JOSEPH M. MILLER, Institute of Human Relations, Yale University.

The hypothesis that voluntary attitudes in human subjects determine conditioning scores was tested with three groups of subjects. A conditioned lid response to light, based on the reflex wink to air-puff, was studied. One group (I) was instructed to inhibit lid movements, another group (F) was instructed to refrain from any voluntary control of lid

movements, and the third group (C) was given no instructions regarding voluntary behavior. Fifty pairings of light and puff were followed by 20 extinction trials (light alone).

The inhibitory attitude resulted in reduced conditioning and rapid extinction, and the facilitatory attitude (group F) led to rapid conditioning and delayed extinction. Group F yielded the most and group I the least conditioning by all criteria. Differences in frequency of appearance, amplitude and latency of response were all reliable. Means of group C were close to those of group I, indicating a predominantly inhibitory attitude in the uninstructed subjects. Differences between means of groups F and C were reliable, those between C and I were not. Inhibitory attitude was correlated with objective response characteristics.

Continuous increment in conditioning during successive 10 pairings in group I gave evidence that the inhibitory set became less and less effective due to repeated reinforcement of the antagonistic CR tendency. Implications with regard to the voluntary control of CR's are stated.

Extinction was most rapid in group I and slowest in group F. A reliable decrement resulted in all groups after 20 non-reinforcements. [15 min., slides.]

12:45 P.M. *Semantic, Syntactic, and Phonotographic Generalization of Verbal Conditioning.* G. H. S. RAZRAN, Columbia University.

Salivary CRs were established in 6 adults to words and sentences flashed on a screen at random order while the subjects were consuming food in 2-minute periods. 'The relation between memory and digestions' was the "given" purpose of the experiment so that the subjects attended carefully to their tasks while unaware of attempts to condition them. The conditioning developed quickly and on the second experimental session transfer tests to words and sentences that had not been specifically associated with the eating were begun. The transfer words were related to the conditioned words either only semantically or only phonotographically (sound-spelling) or through some combination of the two: *e.g.*, *style*, *fashion*, *stile*; *dark*, *night* *mark*; *take-took*, *bake-book*; *lock-latch*, *mock-match*. The conditioned sentences consisted of 3 words—subject, copula, predicate—and in the transfer tests one or more of the 3 were reversed giving rise to 7 verbal variations and to 4 contradictory and 3 concordant statements, *e.g.*, *Poverty is degrading:—Wealth is degrading, Poverty is not degrading, Poverty is not uplifting, Wealth is uplifting*, etc.

Results.—For single-word conditioning, semantic factors were the most potent determinants of the salivary CR transfer or generalization, although phonotographic relationships were also very significant, especially at the beginning of the conditioning and after an excess of it. For the sentences, the order of the dependence of the transfer was general agreement of statement, agreement of copula, predicate, subject, but reversals of copulas interfered more with transfer than general reversals of statements. Conditioned single words lost some of their CR strengths when combined in sentences and subjects' opinions about truths of statements had some effect upon conditionings and transfers of sentences. [15 min., slides.]

ROUND TABLES

MONDAY, SEPTEMBER 4, 4:00 P.M.

The Elementary Course in Psychology. HERBERT S. LANGFELD, *Chairman*. Room 268, Engineering Building. Participants: Warner Brown, Leonard Carmichael, Harold R. Crosland, Elmer K. Culler, John F. Dashiell, Knight Dunlap, R. M. Elliott, Paul R. Farnsworth, J. P. Guilford, E. R. Guthrie, E. R. Hilgard, Donald G. Marquis, John A. McGeoch, E. B. Newman, Willard L. Valentine, William R. Wilson.

TUESDAY, SEPTEMBER 5, 4:00 P.M.

The Meaning of Psychological Meaning in Mental Measurement. PHILIP J. RULON, *Chairman*. Room 521, Hydraulic Laboratory. Arranged by the Program Committee of the Psychometric Society. Participants to be announced.

The Psychology of International Relations and the Prevention of War. NORMAN C. MEIER, *Chairman*. Room 268. Engineering Building. Arranged by the Program Committee of the Society for the Psychological Study of Social Issues. Participants: Floyd H. Allport, Paul R. Farnsworth, Ralph H. Gundlach, Kurt Lewin, Ross Stagner and George M. Stratton.

Relation of Conditioning to Verbal and Voluntary Behavior. ELMER K. CULLER, *Chairman*. Room 50, English Building. Participants: G. H. S. Razran, *Discussion Leader*; Leonard Carmichael, Ernest T. Hilgard, Clark L. Hull, Donald G. Marquis, Carl N. Rexroad.

WEDNESDAY, SEPTEMBER 6, 4:00 P.M.

The Psychology of Industrial Conflict. EDWARD K. STRONG, *Chairman*. Room 2, Education Building. Arranged by the Program Committee of the Society for the Psychological Study of Social Issues. Participants: Paul S. Achilles, Franklin Fearing, Edwin R. Guthrie, George W. Hartman, Arthur W. Kornhauser, Irving Lorge, and Goodwin Watson.

BUSINESS MEETINGS AND PRESIDENTIAL ADDRESSES

ANNUAL BUSINESS MEETING OF THE SOCIETY FOR THE PSYCHOLOGICAL STUDY OF SOCIAL ISSUES

GEORGE W. HARTMANN, *Chairman*

SUNDAY, SEPTEMBER 3, 7:00 P.M.

AUDITORIUM, EDUCATION BUILDING

ADDRESS OF THE CHAIRMAN SOCIETY FOR THE PSYCHOLOGICAL STUDY OF SOCIAL ISSUES

*VALUE AS THE UNIFYING CONCEPT OF THE
SOCIAL SCIENCES*

GEORGE W. HARTMANN

COLUMBIA UNIVERSITY

SUNDAY, SEPTEMBER 3, 9:00 P.M.

AUDITORIUM, EDUCATION BUILDING

ANNUAL BUSINESS MEETING OF THE PSYCHOMETRIC SOCIETY

T. L. KELLEY, *President*

MONDAY, SEPTEMBER 4, 4:00 P.M.

AUDITORIUM, EDUCATION BUILDING

ANNUAL BUSINESS MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.

GORDON W. ALLPORT, *President*

TUESDAY, SEPTEMBER 5, 8:00 P.M.

AUDITORIUM, EDUCATION BUILDING

ADDRESS OF THE PRESIDENT
AMERICAN PSYCHOLOGICAL ASSOCIATION, INC.
THE PSYCHOLOGIST'S FRAME OF REFERENCE

GORDON W. ALLPORT

HARVARD UNIVERSITY

THURSDAY, SEPTEMBER 7, 2:30 P.M.

ROOM 2000, LIFE SCIENCES BUILDING, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

The Members of the Department of Psychology at Stanford University and the University of California will entertain the Members of the Association and their guests at an informal smoker in the Psychological Laboratory after the Presidential Address.

GENERAL ANNOUNCEMENTS, LUNCHEONS, AND DINNERS

Note: Additions to this list will be posted at Headquarters.

GENERAL

Questions concerning local arrangements should be referred to Dr. Calvin P. Stone for Stanford University and Dr. Warner Brown for the University of California.

Reservations for dormitory accommodations should be sent to Dr. E. R. Hilgard, Stanford University, California, well in advance of the meeting dates, giving specific information as to requirements.

Advance arrangements for luncheon groups can be made by writing Dr. Paul R. Farnsworth, Department of Psychology, Stanford University, California.

Apparatus and books will be exhibited at Stanford, in Room 300, Engineering Building. Persons wishing exhibit space should communicate with Dr. E. R. Hilgard, Department of Psychology, Stanford University, the local chairman of exhibits. Exhibitors will be responsible for packing and unpacking their materials and for the cost of shipment.

Questions concerning the program and business meeting of the American Psychological Association should be referred to Dr. Willard C. Olson, Secretary, University of Michigan, Ann Arbor, Michigan.

Questions concerning the program and business meeting of the Psychometric Society should be referred to Dr. Jack W. Dunlap, Secretary, University of Rochester, Rochester, New York.

Questions concerning the program and business meeting of the Society for the Psychological Study of Social Issues should be referred to Dr. I. Krechevsky, Secretary, University of Colorado, Boulder, Colorado.

The Department of Psychology at the University of California at Los Angeles invites psychologists in attendance at the Annual Meeting to visit the new psychology building which should be structurally complete by the time of the meetings. Members of the staff will be available for entertainment of visitors before and after the scheduled programs. Inquiries should be directed to Professor Knight Dunlap, Chairman, Department of Psychology, University of California at Los Angeles. (Santa Monica telephone directory.)

MONDAY, SEPTEMBER 4

There will be a luncheon for alumni of Stanford University at the Stanford Union, at 12:00 o'clock, Monday, September 4. Tickets at 65 cents should be secured at the registration table.

The Psychometric Society dinner meeting will be held Monday, September 4, 1939, at 6:00 P.M. in the Stanford Union. For reservations at \$1.00 each, write to Dr. Jack W. Dunlap, Department of Education, University of Rochester, Rochester, New York.

TUESDAY, SEPTEMBER 5

Members of Psi Chi, national honorary society in psychology, will hold a luncheon meeting at the Stanford Union, Tuesday, September 5, at 12:30 P.M.

Psychological Corporation Luncheon Meeting will be held Tuesday, September 5, at 12:00 in the Stanford Union. For reservations, write to Dr. Paul S. Achilles, Psychological Corporation, 522 Fifth Avenue, New York City.

Members of the Department of Psychology of Stanford University and the University of California will hold an informal reception for members and guests of the American Psychological Association from 4:00 to 6:00 o'clock on Tuesday, September 5, in the Laurence Frost Amphitheater.

THURSDAY, SEPTEMBER 7

Arrangements with the Atlas Travel Service, Berkeley, have been made to provide busses as needed to transport delegates from Stanford to the University of California on the morning of Thursday, September 7, in time for the morning sessions. The Atlas Service will sell tickets at Stanford in advance so that all wishing this service will be provided with transportation.

A general noon luncheon has been arranged for members and guests of the American Psychological Association for Thursday, September 7, at 1:15 P.M., at the International House (end of Bancroft Way, Berkeley). Tickets at 65 cents should be secured in advance at Headquarters.

University of Chicago Luncheon will be held Thursday, September 7, at the International House at 1:30 P.M.

NOTES AND NEWS

THE University of Colorado Summer School announces a *Conference on the Psychology of Learning*, to be held in Boulder, Colorado, August 9-11, 1939, under the direction of Professor K. F. Muenzinger and Dr. I. Krechevsky of the University of Colorado psychology department.

The University extends a cordial invitation to attend this Conference to all psychologists who will be in the vicinity during that period. The program follows:

Wednesday, August 9, 8:00 P.M.

E. C. TOLMAN, University of California: "Motivation in Learning."

Thursday, August 10, 3:00 P.M.

E. C. TOLMAN, University of California: "Trial and Error Learning."

Thursday, August 10, 4:00 P.M.

Panel Discussion of Trial and Error Learning:

K. F. MUENZINGER, Chairman; R. W. BRUCE, University of Wyoming; S. RENSHAW, Ohio State University; R. W. HUSBAND, University of Wisconsin; C. C. DOVE, New Mexico State College.

Thursday, August 10, 8:00 P.M.

N. R. F. MAIER, University of Michigan: "Habit Conflicts and Experimental Neurosis in Animals."

Friday, August 11, 3:00 P.M.

N. R. F. MAIER, University of Michigan: "Problem-Solving in Animals and Men."

Friday, August 11, 4:00 P.M.

Panel Discussion of Problem-Solving:

I. KRECHEVSKY, Chairman; R. A. DAVIS, University of Colorado; ROSS STAGNER, Dartmouth College; E. B. NEWMAN, Swarthmore College.

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